

1977

A study of the blushing response using self-reported data from college students.

Maynard Kirk Davis

University of Massachusetts Amherst

Follow this and additional works at: <https://scholarworks.umass.edu/theses>

Davis, Maynard Kirk, "A study of the blushing response using self-reported data from college students." (1977). *Masters Theses 1911 - February 2014*. 1440.

Retrieved from <https://scholarworks.umass.edu/theses/1440>

This thesis is brought to you for free and open access by ScholarWorks@UMass Amherst. It has been accepted for inclusion in Masters Theses 1911 - February 2014 by an authorized administrator of ScholarWorks@UMass Amherst. For more information, please contact scholarworks@library.umass.edu.

UMASS/AMHERST



312066013804387

A Study of the Blushing Response Using
Self-Reported Data From College Students

A Thesis Presented

By

MAYNARD KIRK DAVIS

Submitted to the Graduate School of the
University of Massachusetts in partial
fulfillment of the requirements for the degree of

MASTER OF SCIENCE

July 1977

Psychology

210


A Study of the Blushing Response Using
Self-Reported Data from College Students

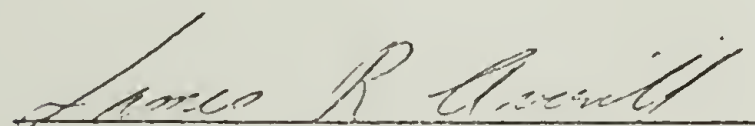
A Thesis

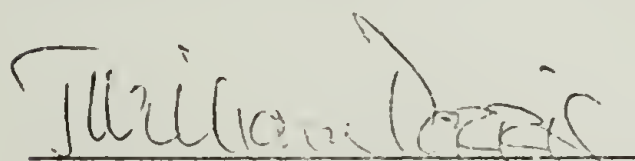
By

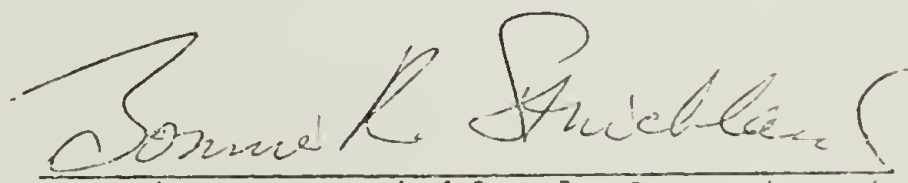
MAYNARD KIRK DAVIS

Approved as to style and content by:


Seymour Epstein, Chairman of Committee


James R. Averill, Member


J. William Dorris, Member


Bonnie R. Strickland, Department
Head, Psychology

July 1977

ACKNOWLEDGEMENTS

I would like to extend my sincere appreciation to my committee: to its chairman, Sy Epstein, whose fundamental enthusiasm for the subject matter sustained my endeavor and whose effort provided the last four items of the blushing report coding format; and to its members, Jim Averill and Bill Dorris, who brought diverse interests to bear on an obscure topic.

My curiosity about the blushing response dates to my undergraduate years at the University of Pennsylvania. I am grateful to Dr. Richard Solomon for the direction which he gave to my initial attempts to study the phenomenon.

Normand Bordeleau, Rhea Cabin, and Susan Roviario performed the coding of the blushing reports. Their task required psychological insight and sensitivity, which they gave in full measure.

Three who made this thesis presentable are Beth Sears, Debbie Filipkowski, and Barbara Bellemare. Beth skillfully prepared the initial set of tables; Debbie produced the finished manuscript in her buoyantly efficient manner; and Barbara typed the first draft with care not only for the accuracy and form of the paper but also for the encouragement of its author. My thanks to each of them.

The patient interest of my parents has been greatly appreciated during the course of the project. I dare say

they never bargained for a psychologist in the family, even one whose status will remain strictly amateur.

My deepest expression of gratitude I reserve for my dear wife, Joanne. Her unswerving confidence in me buttressed my dedication to this thesis and made its successful completion possible.

Dedicated to the Memory of

THOMAS H. BURGESS

ABSTRACT

The study is concerned with normal blushing at embarrassment. The previous neglect of this response by Psychology is considerable; recent research contributions on social embarrassment and on facial expression fall far short of any adequate treatment of the phenomenon.

A brief review of the sparse literature on blushing indicates that the work of Burgess (1839) and of Feldman (1941) concerned abnormal blushing as much as or more than normal blushing; that articles by MacCurdy (1930) and Goodhart (1960) consisted primarily of impractical speculation about the evolution of blushing; and that Darwin's discussion (1872) of the topic was derived from unsystematic observation. The only basically empirical research Psychology has mustered on blushing is by Partridge (1897). However, though the overall strategy embodied in Partridge's study is sound, his research was inadequately designed and poorly analyzed.

Despite the failings of the existent literature, viable research questions can be gleaned from it in five areas: 1) situations eliciting blushing, 2) personality variables affecting blushing, 3) a sex difference in the propensity to blush, 4) age differences in blushing, and 5) inheritability of the response. The research reported in the present study addressed these five topics. It

proceeded with a combination of the narrative self-report methodology originated by Partridge (ibid), a questionnaire on blushing and related issues, and a personality assessment instrument (the Epstein Personality Inventory).

Initial findings, based on 50 male and 50 female college-age subjects, included the occurrence of bodily reference in a majority of the blushing incidents reported by subjects; the instance in over a third of the situations of the subjects' notification by others of their blushing; the infrequency with which adequate face-saving responses were made in the blushing incidents; and the overwhelming acknowledgement by subjects of at least some tendency toward blushing.

Intermediate data organization was accomplished in three ways. First, the content analysis of the subjects' reports yielded variables indicating simply the presence or absence in each report of selected prominent blushing incident features. Second, a factor analysis of ten "embarrassability" items on the questionnaire on blushing pointed to a triadic organization of the embarrassment trait interpretable in terms of general reticence, shame, and modesty. Third, the high reliability of the fifteen-dimension Epstein Personality Inventory allowed the Inventory's consolidation as a unitary measure of general psychological health.

The final analyses were correlational in nature. However, the explication of the findings based on data from the subjects' narratives ultimately required reference back to the subjects' records themselves. The results included the following: individuals who blush from embarrassment about sexual reputation are liable to be told that they are blushing; ridicule or teasing provoking blushing often extends to notification to the blusher of his response; such ridicule concerns the body self of the ridiculed significantly often; and finally, a group setting is powerfully intimidating for blushers, inhibiting face-saving responses.

Among the findings from the questionnaire data were four significant results. Positive correlations existed between the self-reported blushing rate measure and the incidence of blushing in the subject's family, the degree to which embarrassing childhood memories are present for the subject, and the sense of shame embarrassability factor. In addition, females reported a higher tendency toward blushing than males. However, in a multivariate prediction task the sense of shame was found to be a non-significant predictor of blushing. This result was discussed, and it was argued that the three remaining variables are more basic than the present-day psychological make-up of the subject.

The study concluded with a caveat to the effect that all of the relationships found may be confined to the particular age group of the subjects, that of late adolescence and young adulthood.

TABLE OF CONTENTS

	Page
CHAPTER I: INTRODUCTION.....	1
The Dearth of Research on Blushing.....	1
Physiology of Blushing.....	8
Published Studies on Blushing.....	10
Some Viable Research Questions.....	18
Research Strategy.....	20
CHAPTER II: METHOD.....	23
Subjects.....	23
Materials.....	23
Blushing report.....	24
Questionnaire on blushing.....	25
Epstein Personality Inventory.....	26
Content Analysis of the Blushing Reports.....	27
The coding format.....	27
Coding procedure.....	29
CHAPTER III: RESULTS.....	30
Preliminary Selection of Blushing Reports.....	30
Interrater Agreement.....	31
Preliminary Description of the Data.....	36
The blushing reports.....	36
Questionnaire on blushing.....	48
Epstein Personality Inventory.....	51
Intermediate Data Organization.....	53
The blushing reports.....	53

	Page
Questionnaire on blushing.....	56
Epstein Personality Inventory.....	60
Validity of the Blushing Rate Measure.....	61
Data Analysis.....	62
The blushing reports.....	62
Blushing and related issues.....	74
CHAPTER IV: DISCUSSION.....	85
Situations Eliciting Blushing.....	85
Personality Variables Affecting Blushing.....	103
Other Research Topics.....	106
Conclusion by Caveat.....	108
REFERENCES.....	109
REFERENCE NOTE.....	115
APPENDICES	
Appendix A: Research Syllabus on Blushing.....	116
Appendix B: Epstein Personality Inventory.....	125
Appendix C: Blushing Report Coding Format.....	128
Appendix D: Condensed Blushing Reports.....	138
Appendix E: Correlation Matrix.....	158

LIST OF TABLES

	Page
Table 1. Interrater Agreement Scores.....	32
Table 2. Number of Reports in Each Category of Coding Item 1.....	38
Table 3. Number of Reports in Each Category of Coding Item 2.....	39
Table 4. Number of Reports in Each Class of Coding Item 3.....	40
Table 5. Number of Reports in Each Class of Coding Item 4.....	42
Table 6. Number of Reports in Each Category of Coding Item 5.....	45
Table 7. Number of Reports in Each Category of Coding Item 6.....	46
Table 8. Number of Reports in Each Category of Coding Item 7.....	47
Table 9. Means, Standard Deviations, and t-Tests by Sex for Items on the Questionnaire on Blushing.....	49
Table 10. Means, Standard Deviations, and t-Tests by Sex for the Epstein Personality Inventory Dimensions.....	52
Table 11. Percentage of Blushing Reports Containing Selected Blushing Incident Features....	55

Table 12. Factor Analysis of Embarrassability Trait Items From the Questionnaire on Blushing.....	57
Table 13. Intercorrelation Matrix of Blushing Incident Features.....	63
Table 14. Analysis of Presence or Absence of Blush- ing Incident Features by Sex.....	68
Table 15. Intercorrelation Matrices of Blushing Incident Features for Male and Female Subjects.....	71
Table 16. The Presence or Absence of Blushing Incident Features Correlated with Felt Discomfort Recalling the Incident.....	75
Table 17. Pearson Correlations for Three Blushing Variables.....	76
Table 18. First-Order Partial-Correlations, with "Overall Incidence of Blushing" Par- tialed Out.....	79
Table 19. Stepwise Regression Analysis on Anxiety Anticipating Blushing.....	81
Table 20. Stepwise Regression Analysis on Self- Reported Overall Incidence of Blushing.	82
Table A. Intercorrelation Matrix of Items on the Questionnaire on Blushing and Correla- tions between Epstein Personality Dimen- sions and Items on the Questionnaire on Blushing.....	159

C H A P T E R I

INTRODUCTION

Mark Twain is credited with having said, "man is the only animal that blushes--or needs to." Charles Darwin described blushing as "the most peculiar and the most human of all expressions" (1872, p. 309). Editorial comment aside, humorist and scientist alike only reiterated Thomas Burgess's earlier conviction, stated in 1839 in his book The Physiology or Mechanism of Blushing, that blushing is "solely and exclusively a prerogative of the human soul" (p. 83).

Despite such interesting and longstanding speculation on the uniqueness of the human blushing response, the fact remains that blushing has been studied very little. The subject of a book by Burgess, blushing received a chapter from Darwin and has been the topic of a handful of articles since (e.g., Feldman, 1941; Goodhart, 1960; MacCurdy, 1930; Partridge, 1897; Sattler, 1966). The psychological community has mustered only one empirical study (Partridge, *ibid*) of this "most peculiar" of all our expressions. Let us consider why this is so.

The Dearth of Research on Blushing

The principal reason for the neglect of blushing by Psychology is that blushing is one expression of embarrassment; and embarrassment, considered as either emotional

state or social phenomenon, has been judged to be of greater psychological interest than the expressive forms it takes. Thus a considerable literature exists on embarrassment and shame (e.g., Ausubel, 1955; English, 1975; Kaufman, 1974; Lynd, 1958; Riezler, 1943; Zimbardo, Pilkonis & Norwood, 1975) and on the role of embarrassment in social interaction (e.g., Apsler, 1975; Armstrong, 1974; Garland & Brown, 1972; Goffman, 1956; Gross & Stone, 1964; Modigliani, 1968, 1971; Weinberg, 1968), but blushing receives mention everywhere solely to the effect that "(it) is a physiological correlate of embarrassment" (Garland & Brown, *ibid*, p. 281). This treatment completely disregards whatever may be of intrinsic interest about the response, to say nothing of neglecting the possibilities both that blushing may be associated with various personality variables as yet unconsidered and that blushing may occur only in several quite specific types of social predicaments and not in others.

Neglect of the expressive forms of an emotional state is hardly unique to the study of embarrassment. Only in the last quarter century has there been a rekindling of interest in the psychological community in the subject matter to which Darwin devoted his book The Expression of the Emotions in Man and Animals. This resurgence of interest stems from the recognition that emotional expression serves a communicative function and thus mediates social

interaction, often doing so with a code-like efficiency as pronounced as that of verbal language itself. This recognition has placed our expressive repertoire in a new theoretical light; and it has resulted, for example, in investigations into how people decode the emotional signals of others as a topic quite distinct from how people themselves express their emotional experience.

Renewed interest in emotional responses as communicative signals has taken many avenues, most of which fall within the young topic area of "non-verbal communication" (see Duncan's review, 1969). Under this banner studies have proceeded on such diverse topics as paralanguage (extralinguistic vocal communication) and proxemics (communication via spatial relationships), but the bulk of studies have concerned communication via bodily movements (termed "kinesic behavior"). Of interest for our purpose is the fact that a substantial portion of these latter investigations have dealt with facial expression.

The continuing research program of Paul Ekman and his colleagues (Ekman, 1957, 1965; Ekman and Friesen, 1968, 1969, 1976; Ekman, Friesen & Ellsworth, 1972; Ekman, Friesen & Tomkins, 1971) constitutes the mainstay of contemporary research on facial expression. Given Ekman's prolific interest in this topic, it might be reasonable to assume that he has included some consideration of blushing among his diverse research efforts.

Unfortunately, however, this disregards the implicit definition of facial expression outlined above. This definition limits facial expression to movement and thereby excludes blushing, a vascular response. This restrictive conception of facial expression has guided Ekman in stalwart fashion through most of the two-decade course of his investigations.

Ekman's only consideration of facial vascular responses at all occurs in his most recent paper, co-authored with Wallace Friesen (1976, op cit). Ekman and Friesen note the possibility of electro-myographic (EMG) measurement of vascular responses but record that no such work has been published. They also note, however, that ethological investigations of facial behavior have sometimes included reference to a "reddened" face. They cite in particular Blurton-Jones (1971), Grant (1969), and McGrew (1972).

That human ethologists have given greater mention to the response of the "reddened" face than have psychologists reflects ethology's overriding emphasis on exhaustive observational measurement systems (see Tinbergen, 1951). Thus, for example, Grant's reference to a "blush. A flushing of the skin of the face" (op cit, p. 535) and Brannigan and Humphries's reference to "facial reddening-- A reddening of the facial skin from its normal colour" (1972, p. 59) both occur in the context of comprehensive

behavioral "checklists," each of which exceeds one hundred items.

Grant, and Brannigan and Humphries present their separate checklists for use by other investigators. Blurton-Jones (1967; op cit), McGrew (op cit), and Connolly and Smith (1972), on the other hand, have all applied their own respective behavior catalogs, each of which includes the category "red face," to actual research problems, specifically children's interaction patterns. Unfortunately their results are more confusing than clarifying. Whereas for our purpose we would be interested in results with respect to the association of "red face" with shamed or embarrassed behavior, these researchers' findings on "red face" are concerned exclusively with its association with frustrated or angry behavior.

Examining these studies, we have once more encountered a problem of definition. As we have seen, Paul Ekman defines facial expression too narrowly to include vascular responses such as blushing. However, the ethologists we are now considering define their "red face" category too broadly to distinguish between underlying psychological states.

On this definitional issue, note both the terminology and the substance of the following statement by C. B. Goodhart: "the blush of shame....is physiologically in-

distinguishable from the flush of anger" (op cit, p. 56). Ethologists are apparently reluctant, albeit for impeccable reasons of physiology, to attempt the distinction in practice which Goodhart illustrates in terminology. As a result their findings are less interesting psychologically than they might be and are essentially unsystematic: the researchers document the occurrence in their observations of what is obviously the flush of anger, but they fail to discuss or even to acknowledge the absence of the blush of shame.

Goodhart's distinction between the flush of anger and the blush of shame is an important one. However the notion of these like vascular responses serving these two unlike emotions is not new. Thomas Burgess long ago outlined the same idea:

The flush of Rage is as familiar to all as the blush of shame, and although the variation of colour is nearly the same in both cases, still the feelings by which the change is excited are, as every one knows, directly opposed to each other.

(op cit, p. 67)

Moreover other authors have pointed out that facial reddening is not confined to anger and shame. Darwin remarked (op cit) that facial flushing accompanies both crying and

laughing, and Masters and Johnson reported (1966) that it occurs in sexual arousal as part of a response they call the "sex flush." According to McGrew the facial "sex flush" is "physiologically similar to agonistic reddening" (op cit, p. 49).

The range of emotional states which find expression in facial reddening is rather wide. Some researchers have recognized this; and some, like the ethologists, have not. Future studies must avoid this problem by specifying carefully what underlying emotional state is being investigated. Moreover, they must also include some check that their findings actually relate to that state.

For the record the subject of the present paper is blushing at embarrassment. In particular, the normal manifestation of blushing is of principal interest; and embarrassing stimuli shall explicitly include praise as well as blame. Isolating this set of facial reddening responses conforms essentially both to popular and technical usage.

We have been considering the relative dearth of research on blushing and have actually examined both sides of a dichotomy in doing so. On the one hand exists considerable research on emotional states and related social phenomena; this research deals little with expressive responses. On the other hand exists new research in the

field of ethology on expressive responses; this research isolates responses from the emotional states they express. To this point we have failed to consider the handful of articles which actually treat blushing as a psychologically meaningful response, but we shall delay this treatment still further in order to briefly discuss the physiology of blushing.

Physiology of Blushing

Silvan Tomkins has declared, "our precise knowledge of the human face as an expressor and communicator of affect lags far behind our knowledge of its anatomy and physiology" (1962, p. 192). Blushing is no exception to this rule.

Lewis and Landis performed the most direct research on the physiology of blushing in 1929. They treated two sufferers of Raynaud's Disease, a vascular disorder, by unilateral cervical sympathectomy, removing the inferior cervical ganglion, the second dorsal ganglion, and the intervening section of the sympathetic trunk. After thus severing the sympathetic paths to the ipsilateral side of the face, Lewis and Landis made observations on emotional blushing in their first patient. They report the following:

Emotional blushing was deliberately
provoked on a number of occasions
and was witnessed and reported upon
by several observers besides

ourselves; it was sometimes comparatively slight, sometimes deeper. The flushing of the face now under consideration was that accompanied by other evidence of embarrassment, it lasted two or more minutes. The blush in these circumstances appeared upon the right (or normal) side of the face only. It was clearest on the forehead where it ended in a slightly diffuse edge marking almost precisely the middle line.

(ibid, p. 166)

While concluding that "emotional blushing occurs.... through the medium of the sympathetic nerves" (p. 167), Lewis and Landis hesitated to assert that it takes place through the "inhibition of sympathetic tone," a popular theory. This hesitation reflects the controversy then current about the possible existence of active vasodilators among the sympathetic nerve fibers to the skin (e.g., Grant & Holling, 1937; Hyndman & Wolkin, 1941; Lewis & Pickering, 1931). However, subsequent research has disproved this possibility (see Kimber, Gray, Stackpole, Leavell, & Miller, 1966).

Published Studies on Blushing

In 1839 Thomas Burgess gave what can only be a classic description of the phenomenon of blushing:

After the impression is made on the sensorium which is to excite this phenomenon we become immediately conscious of what is about to take place--we feel that the will is overpowered--and, for the time being, is rendered subordinate to the mental powers, and the emotions of sympathy. Now, with the feeling of helplessness, like a bad swimmer when out of his depth, we become flurried, and in our eager attempts to avert the threatened result, by endeavoring to expel from mind or imagination that association of ideas which is about to bring it forth, we only fix it the more firmly, and ensure its full development, to the deep mortification and prostration of our will. (pp. 133-134)

As this passage illustrates, the phraseology which Burgess uses in his treatise on blushing is pure hyperbole by current standards. Though his book is of little more

than historical note, he does cite the absence of blushing among the very young, an observation of potential empirical interest. But probably his most significant contribution consists of the establishment of a distinction between normal and abnormal blushing. The latter was of as much concern to him as the former, and he outlined their distinction with the following statement:

In its healthy state this phenomenon
(blushing) emanates from the impulse
of moral rectitude, and in its diseased
form (it) is entirely the effect of
morbid sensibility. (p. 77)

Subsequently, the notion of abnormal blushing was formalized as "erythrophobia," which was investigated rather vigorously by psychoanalysts in the first half of the twentieth century. However, as has already been indicated, abnormal blushing or erythrophobia does not concern us here.

Charles Darwin, writing some thirty years after Burgess, referred to many of the theories expressed by the earlier author. He generally treated blushing more systematically than Burgess had, but he still relied exclusively on subjective observational data. Among Darwin's findings are the following:

- 1) "the Mental States which induce Blushing....
consist of shyness, shame, and modesty; the
essential element in all being self-attention."
(p. 325)

- 2) "the young blush much more freely than the old, but not during infancy" (p. 310).
- 3) "the tendency to blush is inherited" so that children of parents who blush frequently are also liable to do so (p. 311).

Through a worldwide network of correspondents, Darwin marshalled considerable evidence to show that "blushing.... is common to most, probably to all, of the races of man" (p. 320). Having accomplished this he attempted to explain the evolutionary development of blushing. Darwin's hypothesis, which he himself described as "rash," is simply that "the capillary vessels can be acted on by close attention" (p. 337).

The work of G. E. Partridge (op cit) falls in the mainstream of American psychology at the turn of the century. G. Stanley Hall, a professor of Partridge at Clark University, had canvassed students using a syllabus containing questions on various "nerve signs." Several of the questions concerned blushing, and Partridge analyzed the reports obtained from these questions.

The breakdown of Hall's total student population by age and sex is not given by Partridge. However 120 cases of blushing observed in others and 134 self-reported cases of the phenomenon were gleaned from Hall's study. Only 36 of the cases of blushing observed in others concerned

males, and a mere "four or five" (sic) of the self-reported cases were from males.

Not surprisingly Partridge concluded from his data that "blushing is very much more common among girls than boys" (p. 394), though whether this is justified must remain moot in the absence of more complete demographic information. The dearth of such information also compromises Partridge's other results, among which are two interesting findings on the "causes of blushing": "we find that teasing about the other sex leads. Then follows attention called to the blush" (p. 393).

Despite the difficulty with Partridge's research, it was initiated on a broad empirical base; this is in marked contrast with the informal observational methodology which had preceded it. However Partridge tried his hand at evolutionary speculation as well. Dismissing Darwin's "self-attention" hypothesis as "inadequate," Partridge briefly entertained the theory that blushing is "an atavistic trace of a more widely diffused sex-erethism" (p. 394). This is a reference no doubt to what, as we have already noted, Masters and Johnson (op cit) have more recently called the "sex flush." After brief discussion of this theory, Partridge dismisses it in rather belated fashion on the grounds that the unpleasant emotions frequently accompanying blushing argue against it.

John MacCurdy picked up where Partridge left off when he wrote his article "The biological significance of blushing and shame" in 1930. The entire substance of this article consists of an attempt by MacCurdy to explain blushing's evolutionary course of development.

In essence MacCurdy argues that we blush when we are inclined for any reason to hide. This is so, the author maintains, because the desire for active concealment is ancestrally derived from the immobility reaction which many animals make to danger; and the immobility reaction is mediated by activation of the vagal (or cranial) portion of the parasympathetic nervous system and the inhibition of the sympathetic. Blushing occurs with inhibition of sympathetic vasomotor tone.

If justified, MacCurdy's reasoning would explain the association of blushing with all acts which require concealment because they preclude rapid self-defense. Sexual intercourse is the principal example of this, and MacCurdy claims that "sex (is) the most important cause of embarrassment in our civilization" (p. 181). Also explained is blushing's association with the desire for concealment in situations of discomforting conspicuousness. Such situations include lapses of etiquette and receiving praise too lavish for one's modesty.

MacCurdy's theory rests in part on a testable basis, namely vertebrate physiology. He explains his notion that

the vagal portion of the parasympathetic nervous system mediates the immobility reaction on the grounds of "the modern doctrine of the antagonism of the sympathetic and vagal divisions of the involuntary nervous system"

(p. 174) and the observation that the immobility reaction can be considered the opposite of the "fight-or-flight" reaction (Cannon, 1929), which is mediated by the sympathetic. But the doctrine he cites was not nearly so strict as he portrayed it to be, then or now (see Cannon, *ibid*; Noback, 1967); and MacCurdy's treatment of the role of the parasympathetic nervous system in the immobility reaction is oversimplified as a consequence.

MacCurdy's evolutionary speculation is actually as suspect as his argumentation in matters of physiology. Unfortunately, however, facts bearing on the veracity of such speculation are less easily garnered than in matters of physiology. For example, who can say whether in man the desire for active concealment developed from the immobility reaction, as MacCurdy claims. Concealment may just as easily be the desired result of effective flight. In this difficulty, the theory shares a limitation with all of the speculation that preceded it which assumes an evolutionary timespan, and, for that matter, with all the speculation that follows it: it can be neither proved nor disproved. Wonderfully engrossing, and however well grounded in physiology, such speculation will always remain

an academic exercise of heuristic value only.

MacCurdy's unvarnished conjecture on the "biological significance" of blushing seems to have been undertaken for no other reason than to increase scientific knowledge. In contrast Feldman's subsequent contribution (op cit), which can actually be taken to be equally speculative, was motivated by clinical considerations. Feldman read his paper before the New York Psychoanalytic Society in 1940.

Feldman describes blushing in his paper as a "dreaded symptom," and he claims that "blushing is an exhibitionistic act. It is the exposure of the genital excitement on the face and aims to notify another person of its erotic significance." (p. 249). Clearly this is, to use Feldman's words, a "clinical picture." It is in fact a succinct summary of the substantial psychoanalytic literature on erythrophobia (see Sattler, op cit). However, as such it falls beyond the declared purview of the present paper.

Despite the fact that Feldman and others of his ilk are in general more concerned with the abnormal than with the normal manifestations of blushing, there is a good reason to cite his paper in any treatment of normal blushing. This reason concerns Feldman's claim: "it is surprising that more men blush than women" (p. 250). This at least might be empirically testable.

An article by C. B. Goodhart (op cit), whose distinction between the flush of anger and the blush of shame we have already considered, is the last study we shall take up in our review of published work on blushing. Goodhart's article concerns hair patterns, and skin coloring in general, as well as blushing. In its entirety it takes the form of the evolutionary speculation which we are now familiar with. However, Goodhart's contribution is a highly original one.

Even as Goodhart initiates his discussion of skin coloring, he establishes a theoretical context for blushing which we have only considered obliquely until now. Goodhart asserts, "unlike most mammals, the primates have full colour vision" (p. 55); and, by implication, he immediately draws us back to the note we have already taken of the recently created topic area of nonverbal communication. This raises the idea that blushing is a communicative behavior which exists for its effect on observers. This idea reaches full fruition in Goodhart's claim that facial coloring in general "appears to serve no other purpose than to provide an external sign of anger, embarrassment or fear" (p. 55).

Unfortunately the criticisms which we have already raised against Partridge are no less applicable to Goodhart. Who can really say whether blushing serves a communicative function. Certainly Goodhart's view of the

functionality of blushing is appealing, and both Darwin and Partridge characterize the response as essentially afunctional; but this does not argue conclusively against the latter two theorists' positions. None of the arguments which Darwin, Partridge and Goodhart put forth on the evolutionary development of blushing amount to anything more than interesting guesses about the natural history of the response.

This is not to say that the work of these scientists is not useful. Both Darwin and Partridge have contributed several potential research questions which do not require an evolutionary timespan for testing. Moreover, the other authors we have been considering have all made meager contributions as well. Yet the fact remains that, amidst all the expansive conjecture about blushing, no systematic attempt to study blushing directly has yet appeared. Partridge's work would be an exception to this but for the fact that his data analysis was patently inadequate. In the final analysis Psychology lacks any reliable data whatever on blushing.

The completion of even rudimentary research on blushing would further our knowledge of this response. The author has undertaken such research, which will now be reported.

Some Viable Research Questions

It has been noted that the published work which we

have reviewed does suggest some feasible research questions. The issues addressed by such questions appear to fall into five topic areas: 1) situations eliciting blushing, 2) personality variables affecting blushing, 3) a sex difference in the propensity to blush, 4) age differences in blushing, and 5) inheritability of the response. Let us reconsider each of these areas briefly in turn.

Among the authors we have already cited, Darwin, Partridge, and MacCurdy all commented in some way on what situations blushing appears in. Darwin mentioned the element of self-attention as the essential mental state mediating blushing, and Partridge and MacCurdy both implicated sex as a blushing incident's frequent subject matter. In addition, in a note which can only be considered to beg the question, MacCurdy found "attention called to the blush" to be an important cause of the response.

The effect of personality variables on blushing brought comment from several of the authors we have considered and forms the substance of any discussion of erythrophobia. Judging from the literature, it is plain that there are individuals whose normal tendency to blush is exasperated by what Burgess (op cit) called a "morbid sensibility." Such "morbid sensibility" cannot exist in absolute quantity, however, suggesting that a propensity toward blushing exists across a full range and is possibly influenced by a host of personality variables.

Feldman's assertion that "it is surprising that more men blush than women" (op cit, p. 250) brought controversy to a subject which had previously stood on Partridge's finding of the opposite effect (op cit). Neither author marshalled adequate support for his claim.

Burgess (op cit) and Darwin (op cit) both find age differences in blushing. The latter's dictum that "the young blush much more freely than the old" (p. 310) is of special importance when research limited to college-age subjects is contemplated. Such subjects may be hardly representative of an adult population.

Darwin (op cit) suggested that "the tendency to blush is inherited" (p. 311). In this he actually reiterated a theme which originated with Burgess (op cit) to the effect that a heightened tendency toward blushing may run through families.

What methodology can be brought to bear on the five research areas just discussed. The possibilities are actually quite limited.

Research Strategy

Blushing is not a frequent response in its natural occurrence, and the systematic in-person observation of the response in vivo is essentially impractical. Moreover the possible use of technical aids to facilitate or expedite such observation is out of the question. The EMG measurement which Ekman and Friesen mentioned (op cit)

would be too intrusive; and black-and-white filming or videotaping, as McGrew (op cit) and Ekman and Friesen (ibid) point out, is inadequate for the detection of skin color changes. Only filming in color, or especially in infrared, might escape technical criticism; but it would still be prohibitively expensive considering the amount of filming which would be required for a substantive record of blushing in natural situations.

The experimental induction of blushing responses cannot be ruled out as a possible research program. However the success of such a program would depend on an awareness of what kinds of situations people blush in, a question as yet unanswered. Even were such situations adequately known, it may be impossible to duplicate them in the laboratory.

For a broad selection of blushing incidents, Partridge's self-report methodology (op cit) appears to offer the sole avenue for research. In this connection the deficiencies of Partridge's turn-of-the-century study argue not against the self-report approach but against the haphazard examination of the data. Fortunately content analysis has made great strides since Partridge's day.

Narrative accounts of blushing incidents can suggest a typology of the situations causing blushing, but a comprehensive study should also investigate some diverse specific issues related to blushing. Obviously this would

include some measure of the experimental subject's tendency toward the response. Finally, a study of blushing would be incomplete without some attention to the general personality of the subject.

In accordance with the above considerations, the research herein described proceeded with a triadic approach which consisted of a request of the subject to describe a situation in which he or she had blushed, a "questionnaire on blushing," and a comprehensive personality inventory.

C H A P T E R II

METHODSubjects

The subjects were 50 male and 50 female University of Massachusetts students who participated in the study for experimental credit toward Psychology courses. The modal age category was 18 or younger ($N = 31$); the median age was 20 years. Ninety-four subjects were undergraduates and six designated their university status as "other"; the modal class membership was freshman ($N = 36$).

The subjects were recruited by means of posted sign-up sheets which characterized the research as concerned with "vasomotor reactivity" and as involving a brief personality test and self-report questionnaire. This recruitment method was employed to ensure that subjects starting the experimental session would be unaware that they would be asked to recall an instance in which they blushed.

Though the initial experimental sessions were open to both males and females, the final sessions were restricted to males in order that the research could be based on equal numbers of males and females.

Materials

Each subject received two forms as he entered the laboratory (see Appendices A and B for the text of these

forms). The first form consisted principally of a section in which the subject was to record an instance in which he blushed and a section devoted to a 23-item questionnaire concerning blushing and related issues.¹ The second form was the 83-item Epstein Personality Inventory (Note 1). Subjects recorded their answers on computer opscan sheets provided to them with the two forms.

In summary, the three kinds of items which each subject responded to consisted of: 1) the first form's report section, intended for a narrative description of an instance of the subject's own blushing (hereafter termed the "blushing report"), 2) the 23-item questionnaire on blushing, and 3) the Epstein Personality Inventory. We will take up these three items in turn.

Blushing report

The blushing report was solicited with the request to the subject to "relate, as completely as you can, a situation in which you blushed" and stressing that the full particulars of the situation should be clearly evident in the subject's report.

¹One section of the first form would have required the subjects to record an instance in which they had noticed someone else blush. Preliminary work with pilot subjects indicated that this section was both difficult and time-consuming. Accordingly, experimental subjects were instructed to disregard this section, allowing them additional time to devote to the other sections.

Questionnaire on blushing

This 23-item survey was composed for the present research. It included 20 questions to which the subject provided answers on five-point bipolar scales whose extremes were anchored by question-specific phrases.² In addition three items of the questionnaire required the subject to give his or her age, college class, and sex.

The 19 substantive questions in the survey addressed several different topic areas. The first item requested the subject to assess how comfortable he or she felt recalling the experience described in the blushing report. Four other items related specifically to blushing by measuring the instance of worrying about blushing before a social situation (item 9), the rate of blushing among members of the subject's family (item 10), the general frequency of the subject's own manifestations of the response (item 15), and the frequency of the subject's solitary blushing (item 16). Two survey items concerned the disciplinary style of the subject's parents (item 14) and the importance of childhood memories of embarrassment (item 19). The bulk of the remaining items attempted by disparate means to assess the trait strength of the

²One question included in the survey (the second item) was intended to relate to the report which subjects were originally to have made of someone else's blushing. Subjects were instructed to disregard this question.

subject's embarrassability. Examples of this effort may be found in items four, five, and six: "being complimented or praised by someone is embarrassing to me," "I ask questions in class often/never," and "I have feelings and impulses that I am deeply ashamed of."

Epstein Personality Inventory

This personality assessment instrument requires the experimental subject to respond to 83 emotionally descriptive adjectives (e.g., "secure," "frightened") with ratings indicating how often the subject experiences the particular feelings which the adjectives designate. The subject provides his ratings using a bipolar scale ranging from one to five where the values one, three, and five are anchored with the words "almost never," "usually," and "nearly always" respectively.

The 83 adjectives of the Epstein Personality Inventory are intended to collectively anchor the extremes of fifteen personality dimensions. These dimensions fall into four classes: 1) basic emotions, composed of the unhappy-happy, frightened-secure, and angry-kindly dimensions; 2) energy, composed of the nervous-calm, sluggish-energetic, and unfeeling-alert dimensions; 3) integration, composed of the disorganized-clearminded, conflicted-singleness of purpose, restrained-free, and inhibited-spontaneous dimensions; and 4) self-esteem, composed of the unworthy-worthy, incompetent-competent, disliked-likeable, helpless-powerful, and guilty-pleased with one's values dimensions.

Content Analysis of the Blushing Reports

The coding format

The rating instrument which was applied to the blushing reports was composed for the present research following a preliminary examination of the data (see Appendix C for the text of the coding instrument). The seven items of the protocol concerned seven topic areas: 1) presence and nature of bodily reference, 2) recency of the reported blushing incident, 3) presence and nature of evidence of having blushed, 4) content area, 5) social setting, 6) presence of ridicule, and 7) availability of coping response. These will now be discussed in turn.

The first coding format item categorized the nature of any bodily reference, whether explicitly or implicitly stated, which was evident in the blushing report. Examples of alternative codings within this item are "unwanted bodily exposure" and "sexual reference."

Recency, or how long before the experimental session the blushing occurred, was measured by the second item of the rating instrument. This issue is of interest because it provides an indirect indicator of the normative frequency of blushing in the research population. As such, however, it is of limited precision because subjects were not asked to select the incident they reported according to any temporal criterion.

To allow some notion of the validity of the self-report methodology, the third coding format item assessed the evidence which the subject provided that he or she had indeed blushed in the reported incident. Since subjects were directly requested to provide such evidence, most reports included attempts to do so. Many subjects, for example, had been told by someone that they were blushing; other subjects felt the heat of blushing in their faces.

The fourth coding format item was the most complicated of the seven. It consisted of a comprehensive typology of embarrassing situations and attempted to classify the incident as a whole under one of 22 categories falling into 12 separate classes. The first three of these classes were intended to be the most important, and together they subsume exactly half of the 22 categories. These classes are "physical exposure," "psychological exposure," and "inadequacy." All but two of the remaining nine incident classes consist of single categories. Examples of these are "unprovoked ridicule" and "flattery, admiration, or approval."

The fifth rating item measured the social setting portrayed in the blushing report. The subject was designated in this item as solitary, with one or two other people, or in a group.

The next coding item checked for the presence of ridicule in the blushing incident. However, the item was

more complex than this in that embarrassment was assumed to occur when ridicule of the subject occurred; and the item separated reports without mention of ridicule into those whose incidents did or did not include the suffering of embarrassment by the subject. Thus this item constituted a check that the facial reddening reported by the subject was actually blushing at embarrassment, which is the response we are interested in.

The final item in the coding instrument concerned whether the subject made a coping response in the reported incident and, if so, whether that response was adequate or not. This measure was designed to provide some idea of the effect on behavior of the experience of embarrassment expressed in blushing.

Coding procedure

Two pairs of raters participated in coding the blushing reports. The first pair³ conducted the coding for the first three items of the format, and the second pair completed the content analysis. So that interrater agreement could be calculated, each rater coded all of the blushing reports. Subsequently the two raters on each team together agreed on final codings for each report.

³The present author was a member of the first pair of raters.

C H A P T E R I I I

RESULTS⁴

Although the coding of the blushing reports was conducted with the full text of the reports, each narrative was also put in capsule form for quick reference. Appendix D lists these condensed versions of the reports, arranging them under a subject designation system which specifies the sex of the subject with the letters "M" or "F" and gives each male or female subject a unique number between 1 and 50.

Preliminary Selection of Blushing Reports

Reports from two male subjects were separately identified by all four raters as not concerned with blushing at embarrassment. One of the two subjects (M-27) indicated that he was unable to think of a situation in which he blushed; the other subject (M-19) reported an incident in which he had flushed with anger. Because the research concerned blushing at embarrassment exclusively, these subjects' blushing reports were eliminated from all further

⁴Some missing data were encountered. Three subjects did not answer single questions on the questionnaire on blushing. The overall means for the relevant items were inserted in these subjects' data. Seven subjects omitted a combined total of 18 answers on the Epstein Personality Inventory. However, because the Inventory data were consolidated along 15 dimensions, other inventory item ratings for these seven subjects could be used to estimate dimension scores.

analysis. Each of the remaining 98 reports included evidence of embarrassment on the subject's part. The scores for coding items 1 through 7 for these 98 reports are listed in Appendix D along with the condensed blushing reports.

Interrater Agreement

Interrater agreement was calculated according to the standard formula, which divides the number of reports separately coded by the two raters in one specific category by the total number of reports coded by either rater in that category. The resultant score is a proportion which may range from .00 (perfect disagreement) to 1.00 (perfect agreement). As an example, if both raters agree that three reports fall under one category, but one rater also codes a fourth report under the same category, the proportion of agreement for that category is .75.

A summary interrater agreement statistic is provided by the arithmetic mean of the interrater agreement scores across categories. A mean proportion of agreement of .70 was adopted as the minimum acceptable level of agreement.

Table 1 presents the proportions of agreement for the coding format categories and the mean proportions of agreement. Two mean proportions of agreement are below the required minimum of .70. The first deficiency lies in the assignment of blushing reports to item 3 classes A through D, which concern the presence and nature of

Table 1
Interrater Agreement Scores

<u>Coding Format Division</u>	<u>Proportion of Agreement</u>	<u>Mean Proportion of Agreement</u>
Presence and Nature of Bodily Reference		
Absence of bodily reference	.78	.80
Presence of bodily reference	.81	
Nature of bodily reference ^a		
unwanted bodily reference	1.00	.85
anal functions	.75	
sexual references	.89	
motor functions	1.00	
physical appearance	.63	
Recency of Reported Blushing Incident		
Recency is not evident	.85	.92
Recency is evident	.98	
Recency measurement ^b		
within 24 hours	1.00	.81
within 72 hours	.50	
within one week	.91	
within one month	.65	
within six months	.77	
within one year	.71	
earlier than one year	.94	
earlier than tenth birthday	1.00	
Presence and Nature of Evidence of Blushing		
Assignment to Classes A-D		
no instance of blushing	.00	.44
blushing not mentioned	.78	
subject unsure of blushing	.00	
subject asserts he blushed	.97	

Table 1 Continued

<u>Coding Format Division</u>	<u>Proportion of Agreement</u>	<u>Mean Proportion of Agreement</u>
Assignment within Class D ^C		
no evidence cited	.54	.76
embarrassment cited	.67	
physiological cues	.88	
social feedback	.92	
proprioceptive and social feedback	.89	
other	.67	
Content Areas		
Assignment to 22 categories		
anal-physical functions	1.00	.68
sexual	1.00	
other physical exposure	n.d.	
sexual implications	.90	
lying or deceit	n.d.	
antisocial behavior	1.00	
other psychological exposure	.88	
social awkwardness	1.00	
physical awkwardness	1.00	
intellectual failure	1.00	
moral failure	1.00	
other's physical exposure - sexual	1.00	
other's physical exposure - other	n.d.	
other's private experience - sexual	.00	
other's private experience - other	n.d.	
unprovoked ridicule	.16	
center of attention	1.00	
flattery, admiration, approval	.82	
unwarranted disapproval	.50	
interpersonal sensitive topics	.00	
subject unsure of blushing	.00	
none of the above	.00	

Table 1 Continued

<u>Coding Format Division</u>	<u>Proportion of Agreement</u>	<u>Mean Proportion of Agreement</u>
Assignment to Classes A-C, H, & Other		
physical exposure	.95	.79
psychological exposure	.80	
inadequacy	.85	
flattery, admiration, approval	.82	
other	.54	
Social Setting		
Group of 3 or more	1.00	1.00
Subject alone	1.00	
Subject and 1 or 2 others	1.00	
Presence of Ridicule		
No embarrassment or ridicule	n.d.	.81
Embarrassment without ridicule	.80	
Embarrassment with ridicule	.82	
Availability of Coping Response		
Adequate response available	.62	.73
Inadequate response	.75	
No response	.82	

Note: The proportion of agreement is the number of agreed upon case assignments to a particular coding format class or category divided by the number of cases which either rater assigned to that class or category. The notation "n.d." indicates a proportion which is not defined (i.e., zero in denominator). The mean proportion of agreement is the arithmetic mean of the (defined) proportions of agreement.

Table 1 Continued

^aBased on reports which raters had initially agreed upon as including bodily reference.

^bBased on reports which raters had initially agreed upon as including evidence of recency.

^cBased on reports which raters had initially agreed upon as falling in Class D.

evidence of the subject's actually having blushed in the incident described. However, the low figure (.44) reflects the perfect disagreement in coding classes A and C. These classes are rare and were coded only three times by the raters (once and twice respectively). Thus, in view of the adequacy of interrater agreement in the more important classes B and D, no adjustment of the coding scores was deemed necessary.

The second deficiency in interrater agreement is in the assignment of reports to the basic content area categories. This is more serious but undoubtedly reflects the sheer number of categories used (22). In fact, the numerous categories are hardly useful in any event without some meaningful consolidation. One such consolidation combines the first 11 categories into classes A, B, and C, "physical exposure," "psychological exposure," and "inadequacy," and separates the rest into those which do or do not fall into class H, "flattery, admiration, or approval." As may be seen from Table 1, such a consolidation of content area categories results in a mean proportion of agreement above the .70 minimum (.79).

In summary, since the interrater agreement analysis revealed no overwhelming deficiency in interrater agreement, none of the coding data were discarded.

Preliminary Description of the Data

The blushing reports

Tables 2 through 8 present the frequency distributions for the seven coding items. We will consider each of these distributions in turn.

Table 2 documents the presence and nature of bodily reference in the 98 blushing reports. The majority of the reports (55) do make some reference to bodily exposure, functions, or appearance. Twenty-two incidents, 40% of those with bodily reference, include sexual references; 11 cases concern motor functions.

Table 3 lists the number of reports in each category of the second coding item, concerned with the recency of the reported incident. Subjects were not asked to describe the most recent blushing incident they could remember, although they were asked how recently the incident they described took place. Nevertheless over one-third of the subjects (30) whose cases could be dated based their reports on experiences from the previous week, over one-half (48) from the previous month.

Table 4 provides data with which to address the issue of the validity of self-report methodology in research on blushing. Only two subjects wrote that they were uncertain that their face reddened; fully 88 made clear reference in their reports to having blushed during their experience. Of these 88 subjects, most provided evidence for their assertion that they blushed, although some did not. The largest number (34) felt their blush in their faces, and

Table 2

Number of Reports in Each Category of Coding Item 1

<u>Category</u>	<u>Frequency</u>
No bodily reference	43
Unwanted bodily exposure	9
Anal functions	4
Sexual references	22
Motor functions	11
Physical appearance	9
	<hr/>
	98

Note: Coding item 1 is titled "presence and nature of bodily reference." The table is based on 98 reports.

Table 3

Number of Reports in Each Category of Coding Item 2

<u>Category</u>	<u>Frequency</u>
Not evident	11
Within 24 hours	12
Within 72 hours	7
Within one week	11
Within one month	18
Within six months	13
Within one year	7
Earlier than one year, but after the tenth birthday	18
Earlier than the tenth birthday	1
	<hr/>
	98

Note: Coding item 2 is titled "recency of reported blushing incident." The table is based on 98 reports.

Table 4

Number of Reports in Each Class of Coding Item 3

<u>Class</u>	<u>Frequency</u>
A. Subject cannot think of blushing incident	0
B. Subject nowhere mentions blushing	8
C. Subject is uncertain that face reddened	2
D. Subject asserts that he or she blushed	
no evidence cited	13
embarrassment cited	3
proprioceptive feedback cited	34
social feedback cited	26
proprioceptive & social feedback cited	9
other	3
Total - Class D	88
	<hr/>
	98

Note: Coding item 3 is titled "presence and nature of evidence of having blushed." The table is based on 98 reports.

26 were told that they were blushing; the facial sensations of nine more subjects were combined with notification by others that they were blushing. Thus, if the veracity of subjects is accepted, the data clearly indicate that at least the majority of college students can veridically report a situation in which they blushed at embarrassment. However, the evidence must be considered equivocal beyond this.

The content areas of the blushing reports are given in Table 5. Among classes of content, inadequacy appears the most frequently ($N = 39$); intellectual and moral failure account for 25 of these cases ($N = 12$ and 13 respectively). Following inadequacy in prominence are

- psychological and physical exposure ($N = 22$ and 14 respectively) with sexual implications and sexual functions the most important components of these respective classes ($N = 12$ and 10). As the fourth most frequently scored content class, flattery, admiration, or approval figures in 11 blushing reports.

The data may be made more real by citing respective examples of these more important content categories mentioned above: intellectual failure, moral failure, physical exposure of sexual functions, psychological exposure with sexual implications, and approval. One blusher in the study (M-34) apparently felt intellectual failure when publicly returned a test on which he had tried hard

Table 5

Number of Reports in Each Class of Coding Item 4

<u>Class</u>	<u>Frequency</u>
A. Physical exposure	
anal functions	4
sexual functions	10
other	0
Total - Class A	14
B. Psychological exposure	
sexual implications	12
lying or deceit	0
antisocial behavior	2
other	8
Total - Class B	22
C. Inadequacy	
social awkwardness	9
physical awkwardness	5
intellectual failure	12
moral failure	13
Total - Class C	39
D. Witnessing someone's physical exposure	
sexual connotations	2
other	0
Total - Class D	2
E. Exposure of someone's private experience	
sexual connotations	2
other	0
Total - Class E	2
F. Unprovoked ridicule	0
G. Center of attention without ridicule	3

Table 5 Continued

<u>Class</u>	<u>Frequency</u>
H. Flattery, admiration, or approval	11
I. Unwarranted disapproval	3
J. Discussion of interpersonal sensitive topics	2
K. Uncertainty about having blushed	0
L. None of the above	0
	<hr/>
	98

Note: Coding item 4 is titled "content areas." The table is based on 98 reports.

but done poorly; another (F-44) felt moral failure when accused by a classmate of being a "teacher's pet" after being assigned a special project by a professor. One male subject (M-17) was embarrassed when stripped of his pants at a boisterous party; a female subject (F-24) blushed when a boyfriend's friends teased her about her sexual relationship with her boyfriend. Finally, a pre-med student (M-50) blushed when praised by a stranger at a dinner party about his acceptance at medical school.

The data in Table 6 show that no subject reported a situation of solitary blushing. Roughly two-thirds of the subjects (67) were in groups of four or more when their blushing occurred; 31 were with one or two others during their experience.

Judging from Table 7, ridicule was a component in a majority of the blushing incidents ($N = 54$). Forty-four subjects indicated that they were embarrassed but did not feel ridiculed.

Turning to Table 8, we note that the majority of the students (57) effected some response while embarrassed and blushing. However, only one out of every three of these subjects made an adequate response, one which alleviated the embarrassment and reunited the subject with his or her companions. Forty-one blushers made no response at all in the incident.

Table 6

Number of Reports in Each Category of Coding Item 5

<u>Category</u>	<u>Frequency</u>
Subject and 3 or more others present	67
Subject alone	0
Subject and 1 or 2 others present	31
	<hr/>
	98

Note: Coding item 5 is titled "social setting." The table is based on 98 reports.

Table 7

Number of Reports in Each Category of Coding Item 6

<u>Category</u>	<u>Frequency</u>
No embarrassment or ridicule	0
Embarrassment but no ridicule	44
Embarrassment and ridicule	54
	<hr/> 98

Note: Coding item 6 is titled "presence (at anytime) of ridicule." The table is based on 98 reports.

Table 8

Number of Reports in Each Category of Coding Item 7

<u>Category</u>	<u>Frequency</u>
Adequate face-saving response made	19
Inadequate response made	38
No response made	41
	<hr/>
	98

Note: Coding item 7 is titled "availability of coping response." The table is based on 98 reports.

Questionnaire on blushing

Table 9 presents descriptive statistics for the nineteen substantive items on the questionnaire on blushing. Table 9 also contains the results of t-tests for sex differences on the nineteen items.

On issues specifically relating to blushing, subjects characterized themselves as not often anxious because of anticipation of blushing ($M = 1.90$) and as very little inclined toward solitary blushing ($M = 1.45$) but as hardly disinclined toward blushing in general ($M = 2.93$). The only significant sex difference listed in Table 9 qualifies the last of these findings: males rate their normal blushing significantly less than do females ($M = 2.70$ and 3.16 respectively; $t = -2.12$; $p < .05$). However, clearly for both sexes normal blushing is not at all a rare response nor one made unawares.

Several findings are noteworthy elsewhere in Table 9. Interestingly enough, the subjects' average overall rating of their parents on a "demanding-accepting" dimension falls exactly at the scale midpoint. On selected items of the dozen or so loosely addressed to the trait strength of the subject's embarrassability, on the average subjects expressed substantial sensitivity toward disapproval in general ($M = 3.81$) but evidenced little to hide when rating their fear that their true self would be disapproved of ($M = 1.81$). Overall, subjects described

Table 9
Means, Standard Deviations, and t-Tests by Sex
for Items on the Questionnaire on Blushing

<u>Questionnaire Item</u>	<u>Overall Mean</u>	<u>SD</u>	<u>Means by Sex</u> <u>Male</u> <u>Female</u>	<u>t</u>
Discomfort felt by subject recalling an instance of blushing	2.45	1.37	2.30 2.60	-1.09
Sensitivity felt by subject toward disapproval	3.81	.95	3.74 3.88	- .73
Embarrassment felt by subject at praise and/or compliments	2.87	1.28	2.90 2.84	.23
Frequency of subject's asking questions in class	2.90	1.36	2.74 3.06	-1.18
• Presence felt by subject of deeply shameful impulses	2.20	1.16	2.28 2.12	.69
Anxiety felt by subject re. what others think of him	3.64	1.12	3.58 3.70	- .53
Self-reported style of dress (conservative-"modish")	3.16	.84	3.10 3.22	- .71
Incidence of subject's anxiety anticipating blushing	1.90	1.21	1.96 1.84	.49
Incidence of blushing among family members	2.36	1.19	2.46 2.26	.84
Anxiety felt by subject talking before a group	3.56	1.19	3.58 3.54	.17
Subject's self-characterization (introvert - extrovert)	3.25	1.20	3.18 3.32	- .58

Table 9 Continued

<u>Questionnaire Item</u>	<u>Overall Mean</u>	<u>SD</u>	<u>Means Male</u>	<u>by Sex Female</u>	<u>t</u>
Subject's self-reported satisfaction with self	3.65	1.04	3.46	3.84	-1.85
Parental style (demanding - accepting)	3.00	1.41	2.90	3.10	- .71
Subject's self-reported overall incidence of blushing	2.93	1.10	2.70	3.16	-2.12*
Incidence of solitary blushing by subject	1.45	.86	1.30	1.60	-1.77
Subject's use of denial when spoken well of	2.40	1.14	2.44	2.36	.35
Subject's fear that his true self would be disapproved of	1.81	.92	1.96	1.66	1.65
Presence felt by subject of embarrassing childhood memories	2.36	1.43	2.46	2.26	.70
Self-rated skin-coloring (light - dark)	2.04	1.00	2.10	1.98	.60

Note: The scale range is 1-5. Unless otherwise noted, increasing scale values indicate increasing magnitudes of the questionnaire items. The table is based on data from 100 subjects.

*p < .05

themselves as substantially satisfied with themselves ($M = 3.65$) and placed themselves on the extroverted side of the "introvert-extrovert" dimension ($M = 3.25$).

Table A of Appendix E contains the matrix of inter-correlations for the nineteen items on the questionnaire on blushing. The abundance of significant statistics defies any fine analysis, but note can be taken of the two pairs of variables with the lowest and highest number of significant correlations. They are, respectively, style of dress (zero significant correlations) and skin-coloring (two correlations), anxiety felt by the subject about what others think of him (11 correlations) and presence of embarrassing childhood memories (12 correlations). The importance of the latter two variables will be more systematically implicated in subsequent analyses yet to be described.

Epstein Personality Inventory

Table 10 lists the means, standard deviations, and sex difference t-statistics for the 15 dimensions of the Epstein Personality Inventory. Of immediate note is the fact that all 15 means fall on the side of psychological health on the five-point scale. Considering the extreme scores it is also interesting that the three lowest means are drawn from the integration dimensions (conflicted-singleness of purpose: $M = 3.05$; restrained-free: $M = 3.36$; inhibited-spontaneous: $M = 3.31$) and that four of the six

Table 10
Means, Standard Deviations, and t-Tests by Sex
Epstein Personality Inventory Dimensions

<u>Class and Dimension</u>	<u>Overall Mean</u>	<u>SD</u>	<u>Means by Sex</u>		<u>t</u>
			<u>Male</u>	<u>Female</u>	
Basic Emotions					
Unhappy-Happy	3.68	.70	3.52	3.84	-2.33*
Frightened-Secure	3.60	.65	3.63	3.57	.47
Angry-Kindly	3.86	.55	3.78	3.95	-1.54
Energy Dimensions					
Nervous-Calm	3.41	.76	3.40	3.42	- .09
Sluggish-Energetic	3.66	.62	3.65	3.66	- .03
Unfeeling-Alert	3.96	.55	3.78	4.14	-3.44**
Integration Dimensions					
Disorganized-Clear- minded	3.60	.67	3.58	3.62	- .29
Conflicted-Singleness of Purpose	3.05	.76	3.01	3.09	- .56
Restrained-Free	3.36	.71	3.28	3.44	-1.16
Inhibited-Spontaneous	3.31	.81	3.20	3.42	-1.34
Self-Esteem Dimensions					
Unworthy-Worthy	3.84	.73	3.72	3.95	-1.60
Incompetent-Competent	3.99	.65	3.97	4.01	- .26
Disliked-Likeable	3.84	.66	3.77	3.90	- .98
Helpless-Powerful	3.65	.58	3.65	3.65	.02
Guilty-Pleased with One's Values	4.07	.62	4.04	4.10	- .52

Note: The scale range is 1-5. Scales are in the direction indicated by the dimension name. The table is based on data from 100 subjects.

*p < .05

**p < .01

highest scores are self-esteem dimensions (unworthy-worth: $M = 3.84$; incompetent-competent: $M = 3.99$; disliked-likeable: $M = 3.84$; guilty-pleased with one's values: $M = 4.07$). In general the subjects apparently feel less directed and "together" than they might, though at no loss to their sense of self-worth.

If the integration and self-esteem dimensions contain some of the extreme overall means, the basic emotion and energy dimensions contain the only significant sex differences. According to these results, male subjects are less happy than females ($M = 3.52$ and 3.84 respectively; $t = -2.33$; $p < .05$) and also less alert ($M = 3.78$ and 4.14 ; $t = -3.44$; $p < .01$).

- Table A of Appendix E includes the correlations between the Epstein Personality Inventory dimensions and the items on the questionnaire on blushing as well as the intercorrelations for the blushing questionnaire items themselves. Applying the same crude analysis as before, two dimensions are singled out for comment: the angry-kindly dimension has the fewest significant correlations of the 15 (five), and the helpless-powerful dimension has the most (14).

Intermediate Data Organization

The blushing reports

The use of the blushing report methodology was intended to reveal what sets of embarrassing circumstances

blushing occurs in and whether blushing is significantly associated with identifiable behaviors by either the subject or the others present. In light of this purpose the data from the coding format must be considered somewhat unwieldy because they are nominal in their level of measurement (Stevens, 1946). Accordingly these data formed the basis for the creation of dichotomous variables denoting the absence or presence of several blushing incident features. These features were selected for their demonstrated prominence in the blushing reports.

Table 11 refers to the new dichotomous variables in listing the percentage of blushing reports which contain the selected blushing incident features. Thus the first new variable is derived from Coding Item 1 and concerns the absence or presence of bodily reference in the report; we note from the Table that 56% of the cases include some form of bodily reference. Likewise, 36% of the reports indicate that the subject was notified by others present that he or she was blushing; 68% depict the subject in a group setting; and 55% refer to ridicule received by the subject.

Two of the blushing incident features presented in Table 11, the first and the last, actually subsume other features of interest. This necessitated further analysis, whose results are also listed in the Table. Considering these findings, we note that in 40% of the cases with

Table 11
Percentage of Blushing Reports Containing
Selected Blushing Incident Features

<u>Blushing Incident Feature</u>	<u>Percentage of Reports Containing a Feature</u>
Bodily reference	56
specifically sexual reference	40
Notification of blushing	36
Content Areas	
Physical exposure	14
Psychological exposure	22
Inadequacy	40
Approval	11
Other	12
Group Setting	68
Ridicule	55
Response by subject	58
specifically an adequate response	33

Note: N = 98 except in the analysis with "specifically sexual reference" (N = 55 cases with bodily reference) and in the analysis of "specifically an adequate response" (N = 57 cases with a response by the subject).

bodily reference, this reference was specifically sexual in nature; and in cases where subjects effected a response while blushing, only 33% of these responses were adequate ones.

The content areas appear in Table 11 in the form of the consolidation of categories which was first discussed in connection with the interrater agreement analysis. Thus subsequent analysis using these five content area variables will be based on reliable data.

Questionnaire on blushing

Though the subject's answers to the nineteen substantive items of the questionnaire on blushing are of interest in and of themselves and have already been reported in summary form, a factor analysis of a select group of these items was undertaken in the hope that it would yield data which might be of additional interest and which would be more amenable to subsequent analysis.

All 10 of the questionnaire items submitted to factor analysis were designed originally to measure possible aspects of the trait of embarrassability. These items are listed in Table 12 along with the results of the analysis. Three factors were revealed by the principal component analysis.⁵ These factors account for 58.8% of the variance.

⁵The SPSS PA2 factor analysis subprogram was used (Nie, Hall, Jenkins, Steinbrenner & Bent, 1975); varimax rotation was specified. The PA2 subprogram employs an
(continued)

Table 12
Factor Analysis of Embarrassability Trait Items
From the Questionnaire on Blushing

<u>Questionnaire Item</u>	Factor		
	<u>1</u>	<u>2</u>	<u>3</u>
Sensitivity felt by subject toward disapproval	.47	.43	-.03
Embarrassment felt by subject at praise and/or compliments	.18	-.05	.60
Frequency of subject's asking questions in class	-.63	-.10	-.27
Presence felt by subject of deeply shameful impulses	.17	.43	.11
Anxiety felt by subject re. what others think about him	.22	.86	.00
• Anxiety felt by subject talking before a group	.64	.14	.02
Subject's self-characterization (introvert - extrovert)	-.57	-.21	-.09
Subject's self-reported satisfaction with self	-.13	-.40	-.21
Subject's use of denial when spoken well of	-.02	.43	.75
Subject's fear that his true self would be disapproved of	.08	.38	.37

As can be seen from Table 12, the factor analysis does indeed result in interesting findings. The three significant factors are relatively simple in structure and are easily interpretable in a psychologically meaningful way. We will consider each in turn.

The first factor accounts for 32.3% of the variance and may be understood by examining the three variables which load most highly on it. Anxiety felt talking before a group receives a positive loading (.64), and both frequency of asking questions in class and self-characterization as extroverted on an "introvert-extrovert" scale receive negative ones (-.63 and -.57 respectively). This factor apparently measures the degree to which subjects are confident speaking with others and interacting socially in groups. It was designated the reticence factor.

The second factor accounts for 14.3% of the variance. Two variables have their only high loadings on this factor: presence felt by the subject of deeply shameful impulses (.43) and anxiety felt by the subject about what

5 cont.

iterative process for estimating the communalities in the correlation matrix diagonal; initial estimates are squared multiple correlations. Only factors with an eigenvalue greater than 1.0 are selected for rotation. The PA2 sub-program computes standardized factor scores based on all the variables in the factor analysis.

others think of him (.86). The importance of the latter variable has already been suggested by the number of high correlations it has with other items on the questionnaire on blushing; and, indeed, its loading on the second factor is the highest of any in Table 12. Its connection with shameful impulses indicates that what is at issue in the subject's anxiety about what others think of him are inner thoughts and experiences about which the subject is secretive and highly conflicted. What the factor seems to measure is the sense of shame or guilt.

The third factor accounts for 12.2% of the variance and consists primarily of embarrassment at praise and/or compliments (.60) and use of denial when spoken well of (.75). Clearly the principal ingredient here is public humility in one's appraisal of oneself. This factor concerns the sense of modesty.

The factor analysis implies a well-differentiated triadic organization of the trait of embarrassability. This triad consists of a more general component of reticence and the two more specific components of shame and modesty. The triad suggests that there are three different varieties of social dis-ease. Some shy individuals are reluctant merely to talk with others, to give even preliminary impressions of themselves in what they say. Other individuals harbor inclinations whose social acceptability they are apprehensive about; they worry specifically about doing the wrong thing. Still others

may possess special strengths or abilities but diligently guard their status as ordinary individuals, perhaps defending against an incipient sense of vanity.

A word is in order at this point about two items on the questionnaire on blushing which were excluded from the factor analysis just described. These have to do with style of dress and skin-color, and we recall that they showed practically no significant correlations with other items on the questionnaire on blushing. More particularly, however, these were the items which most often prompted subjects to request clarification from the experimenter. In hindsight it is obvious that the dimensions "conservative-'modish'" and "light-dark" lack sufficient definition for serious research purposes. The items are not included in further analysis.

Epstein Personality Inventory

The possibility suggested itself that the Epstein Personality Inventory might be used as a comprehensive instrument yielding a single index of psychological health. Each of the fifteen dimensions of the Inventory clearly ranges from the detrimental to the salutary in character and temperament. With this possibility in mind, statistical analysis was applied to the Inventory as a whole; and the result was a more than adequate measure of reliability (Cronbach's Alpha = .94).⁶ Accordingly, an average score

⁶The SPSS Reliability subprogram was used; the Alpha model was specified. This subprogram calculates Cronbach's
(continued)

for the fifteen dimensions was computed for each subject. The mean of these scores is 3.66; the standard deviation is .50.

Validity of the Blushing Rate Measure

Before proceeding to the main analyses of the study, we should consider one last quantitative finding on the reliability and validity of the research methodology. The study actually includes two measures of the incidence of blushing by subjects, one direct, the other indirect. The direct assessment is self-reported on the questionnaire item: "I blush often/never"; the indirect resides in the "recency" coding item applied to the blushing reports. The validity of the direct assessment may be estimated by its correlation with the indirect since those who actually blush more frequently than others would logically be expected, on the average, to describe more recent incidents in their blushing reports. This is in fact the case, as the highly significant correlation between the two measures indicates ($r(85) = -.34; p < .001$).⁷

⁶ cont.

Alpha (Cronbach, 1951) and the standardized item Alpha, both of which were .94.

⁷ Recency was coded on an ordinal scale of measurement (Stevens, op cit), and strictest statistical practice does not permit the application of Pearson product-moment correlation to such scales. However, following suggestions by Anderson (1961), Lord (1953), and Mosteller (1958), strict practice was disregarded in this instance in favor of careful interpretation of the resultant correlation.

(continued)

Data Analysis

The intermediate data organization outlined above has served to consolidate the data base along meaningful lines. It leaves us with one set of variables concerned with the blushing reports and another set of variables concerned with blushing and related issues. Correlational analyses were applied separately to both of these sets of variables.

The blushing reports

For the analysis of the 12 dichotomous variables derived from the coding of the blushing reports, Pearson product-moment correlations were preferred to either phi coefficients or χ^2 statistics not only because of increased degrees of freedom but also because they reveal the direction of any association between two variables. Table 13 presents the intercorrelation matrix for the 12 variables.

Of the 54 intercorrelations listed in the Table, 13 are statistically significant at the .05 level or higher. Eight of these are positive, and five are negative. The 13 variable pairs are listed below:

Positively correlated

Specifically sexual reference	with	notification of blushing
----------------------------------	------	-----------------------------

7 cont.

As expected, the correlation is negative because low values of the recency variable indicate more recent incidents. The analysis was based only on those subjects for whom recency could be measured; hence $df = 85$. A one-tailed significance test is used.

Table 13

Intercorrelation Matrix of Blushing Incident Features

<u>Blushing Incident Feature</u>	Pearson Correlations			
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
1. Bodily reference				
2. Specifically sexual reference	NA			
3. Notification of blushing	.10	.39**		
Content Areas				
4. Physical exposure	.36***	-.39**	-.12	
5. Psychological exposure	.13	.58***	.21*	NA
6. Inadequacy	-.37***	-.10	.00	NA
7. Approval	-.01	-.29*	.00	NA
8. Other	.02	.13	-.15	NA
9. Group Setting	.06	-.13	.14	-.10
10. Ridicule	.24*	.20	.42***	.02
11. Response by subject	.17	.20	.07	.05
12. Specifically an adequate response	.08	.10	-.03	-.10

<u>Blushing Incident Feature</u>	Pearson Correlations			
	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
1. Bodily reference				
2. Specifically sexual reference				
3. Notification of blushing				
Content Areas				
4. Physical exposure				
5. Psychological exposure				

Table 13 Continued

<u>Blushing Incident Feature</u>	Pearson Correlations			
	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
6. Inadequacy	NA			
7. Approval	NA	NA		
8. Other	NA	NA	NA	
9. Group Setting	.10	-.12	.10	.05
10. Ridicule	.19	.06	-.20*	-.16
11. Response by subject	.01	.10	-.09	-.12
12. Specifically an adequate response	-.12	-.03	.04	.31*

<u>Blushing Incident Feature</u>	Pearson Correlations			
	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>
1. Bodily reference				
2. Specifically sexual reference				
3. Notification of blushing				
Content Areas				
4. Physical exposure				
5. Psychological exposure				
6. Inadequacy				
7. Approval				
8. Other				
9. Group Setting				
10. Ridicule	.27**			
11. Response by subject	-.22*	.15		
12. Specifically an adequate response	.05	.03	NA	

Table 13 Continued

Note: Row placement of the blushing incident features, as indicated by the numbers 1 through 12, is identical to column placement. N = 98 except in the analysis with "specifically sexual reference" (N = 55 cases with bodily reference), in the analysis with "specifically an adequate response" (N = 57 cases with a response by the subject), and in the analysis of these two features together (N = 36). The notation "NA" (not applicable) is entered in the table where correlations would not be meaningful. The correlations are computed with the values 0 and 1 respectively denoting the absence or presence of a blushing incident feature. Two-tailed significance tests are used.

$$* p < .05$$

$$** p < .01$$

$$*** p < .001$$

Physical exposure	with	bodily reference
Psychological exposure	with	specifically sexual reference
Psychological exposure	with	notification of blushing
Other content	with	specifically an ade- quate response
Ridicule	with	bodily reference
Ridicule	with	notification of blushing
Ridicule	with	group setting
<u>Negatively correlated</u>		
Physical exposure	with	specifically sexual reference
Inadequacy	with	bodily reference
Approval	with	specifically sexual reference
Approval	with	ridicule
Group setting	with	response by subject

A few of these relationships are trivial in nature. For example, we would logically expect bodily reference to correspond with physical exposure. Of the more psychologically meaningful relationships, some are more easily interpreted than others. For example, it is not surprising to find that ridicule evidently extends itself in a substantial number of cases to telling the ridiculed that he or she is blushing. But explaining the association between "specifically sexual reference" and "notification of blushing" in cases with bodily reference is not as easy

a task. While hypotheses can be advanced for this and other obscure relationships, clearly the best course lies in returning to the blushing reports themselves for a notion of just how these features relate to each other. Because such a return to the raw data may ultimately take impressionistic directions, we will postpone it until after the formal presentation of results. For now, suffice it to say that, given the methodology we have employed, these blushing incident features are significantly associated with each other.

Before we leave the topic of the blushing reports however, two more analyses must be described. The first concerns the sex of the subject and the second the anxiety which subjects reported feeling as they completed their blushing reports.

Table 14 gives descriptive statistics and the results of the correlational analysis of the blushing report data for sex differences. There are some interesting trends but no statistically significant results. Specifically, incidents described by males more often included bodily reference; but when bodily reference was a part of the incident, it was specifically sexual reference more often for females than for males. Perhaps related to this finding is the fact that physical exposure was a more common experience for men and psychological exposure more common for women. A final note should be made of the tendency,

Table 14

Analysis of Presence or Absence of Blushing Incident Features by Sex

<u>Blushing Incident Feature</u>	Percentage of reports containing a feature arranged by sex of subject		Pearson correlation of presence or absence of a feature ^c with Sex of Subject ^c
	Male ^a	Female ^b	
Bodily reference	63	50	-.13
Specifically sexual reference	33	48	.15
Notification of blushing	31	40	.09
Content Areas			
Physical exposure	21	8	-.18
Psychological exposure	19	26	.09
Inadequacy	35	44	.09
Approval	13	10	-.04
Other	13	12	-.01
Group Setting	73	64	-.10
Ridicule	52	58	.06
Response by subject	58	58	.00
Specifically an adequate response	43	24	-.20

Table 14 Continued

^aN = 48 except in the analysis with "specifically sexual reference" (N = 30 cases with bodily reference) and in the analysis with "specifically an adequate response" (N = 28 cases with a response by the subject).

^bN = 50 except as above (N = 25 and 29 respectively)

^cN = 98 except as above (N = 55 and 57 respectively).

The correlations are computed with the values 0 and 1 respectively denoting the absence or presence of a blushing incident feature and the values 1 and 2 respectively denoting male and female sex. Two-tailed significance tests are used. None of the correlations is statistically significant.

when the subject chose to respond in the embarrassing situation, for men to respond adequately more often than women.

Despite the fact that no significant sex differences appear in the blushing report data, the separate inter-correlation matrices arranged by sex in Table 15 still bear looking at. No variable pair which was not statistically significant for the overall subject pool (see Table 13) is significant in either of the data sets for male and female subjects. However, three variable pairs which were listed as significant in Table 13 show minimal correlations ($|r| < .10$) in one or the other half of the Table 15 matrix. These three pairs, along with the correlations, are tabulated below:

<u>Variable pair</u>	Correlation, arranged by sex of subject	
	<u>Male</u>	<u>Female</u>
Other content with specifically an adequate response	.04	.60***
Ridicule with group setting	.07	.46***
Approval with ridicule	-.02	-.39**

The latter two findings appear to be the easier to interpret. They imply that ridicule toward men pervades smaller gatherings as often as it touches larger ones and that, undoubtedly in its lesser form, ridicule often flavors approval received by men; ridicule toward women seems to be more strictly sanctioned. The first finding,

Table 15
Intercorrelation Matrices of Blushing Incident
Features for Male and Female Subjects

<u>Blushing Incident Feature</u>	Pearson Correlation			
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
1. Bodily reference		NA	.08	.29*
2. Specifically sexual reference	NA		.28	-.20
3. Notification of blushing	.15	.49**		-.09
Content Areas				
4. Physical exposure	.40**	-.50**	-.12	
5. Psychological exposure	.04	.53**	.25	NA
6. Inadequacy	-.24	.05	-.12	NA
7. Approval	-.10	-.24	.15	NA
8. Other	-.10	.24	-.12	NA
9. Group Setting	-.08	-.15	.11	-.15
10. Ridicule	.38**	.05	.29*	-.02
11. Response by subject	.22	.05	.02	.23
12. Specifically an adequate response	-.09	.26	.18	-.23

<u>Blushing Incident Feature</u>	Pearson Correlation			
	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
1. Bodily reference	.23	-.48***	.07	.12
2. Specifically sexual reference	.61***	-.28	-.35	.02
3. Notification of blushing	.17	.10	-.14	-.18
Content Areas				
4. Physical exposure	NA	NA	NA	NA

Table 15 Continued

		Pearson Correlation			
<u>Blushing Incident Feature</u>		<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
5.	Psychological exposure		NA	NA	NA
6.	Inadequacy	NA		NA	NA
7.	Approval	NA	NA		NA
8.	Other	NA	NA	NA	
9.	Group Setting	.17	-.14	.23	-.05
10.	Ridicule	.14	.10	-.02	-.27
11.	Response by subject	-.14	.10	-.06	-.19
12.	Specifically an adequate response	.06	.19	-.07	.04
		Pearson Correlation			
<u>Blushing Incident Feature</u>		<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>
1.	Bodily reference	.17	.12	.12	.18
2.	Specifically sexual reference	-.11	.39	.39	-.03
3.	Notification of blushing	.19	.53***	.12	-.18
Content Areas					
4.	Physical exposure	-.09	.10	-.20	-.11
5.	Psychological exposure	.06	.23	.13	-.20
6.	Inadequacy	-.09	.02	.10	-.22
7.	Approval	-.03	-.39**	-.12	.16
8.	Other	.15	-.06	-.06	.60***
9.	Group Setting		.46***	-.22	.18
10.	Ridicule	.07		.10	-.22
11.	Response by subject	-.23	.20		NA
12.	Specifically an adequate response	-.11	.25	NA	

Table 15 Continued

Note: Row placement of the blushing incident features, as indicated by the numbers 1 through 12, is identical to column placement. The left half of the matrix is based on cases from male subjects. In this half of the matrix, $N = 48$ except in the analysis with "specifically sexual reference" ($N = 30$ cases with bodily reference), in the analysis with "specifically an adequate response" ($N = 28$ cases with a response by the subject), and in the analysis of these two features together ($N = 20$). The right half of the matrix is based on cases from female subjects. $N = 50$ in this half of the matrix except as above ($N = 25, 29$, and 16 respectively). The notation "NA" (not applicable) is entered in the table where correlations would not be meaningful. The correlations are computed with the values 0 and 1 respectively denoting the absence or presence of a blushing incident feature. Two-tailed significance tests are used.

$$* p < .05$$

$$** p < .01$$

$$*** p < .001$$

however, defies intuition and must await a close re-examination of the reports themselves.

The correlations in Table 16 estimate the relationship between the various blushing incident features and the discomfort the features engendered in their description in the blushing reports.⁸ None of the correlations is statistically significant; and except for the last one, which seems counterintuitive, none would seem to warrant comment. Chance is as good an explanation for the positive relationship between "felt discomfort recalling the incident" and "specifically an adequate response" as any which this author can provide. Perhaps the more severely embarrassing situations were the ones which tended to motivate adequate responses most often when responses were made.

Blushing and related issues

It remains to analyze the data concerned with the three items on the questionnaire on blushing which measure the subject's anxiety anticipating blushing, the subject's overall incidence of blushing, and the incidence of solitary blushing by the subject. Table 17 presents the correlations between these variables and nine other variables:

⁸It should be noted that there are no significant sex differences in the "discomfort" variable ($r(96) = -.09$; $p = \text{n.s.}$).

Table 16

The Presence or Absence of Blushing Incident Features
Correlated with Felt Discomfort Recalling the Incident

<u>Blushing Incident Feature</u>	<u>Pearson correlation with discomfort felt by subject recalling the blushing incident^a</u>
Bodily reference	.01
Specifically sexual reference	.16
Notification of blushing	.10
Content Areas	
Physical exposure	.01
Psychological exposure	.15
Inadequacy	.00
Approval	-.10
Other	-.11
Group Setting	.15
Ridicule	-.01
Response by subject	.10
Specifically an adequate response	.24

Note: N = 98 except in the analysis with "specifically sexual reference" (N = 55 cases with bodily reference) and in the analysis with "specifically an adequate response" (N = 57 cases with a response by the subject). The correlations are computed with the values 0 and 1 respectively denoting the absence or presence of a blushing incident feature. Two-tailed significance tests are used.

^aNone of the correlations is statistically significant.

Table 17

Pearson Correlations for Three Blushing Variables

<u>Variable</u>	<u>Subject's anxiety anticipating blushing</u>	<u>Subject's overall incidence of blushing</u>	<u>Incidence of solitary blushing by subject</u>
Incidence of blushing among family members	.35***	.43***	.27**
Parental style (demanding - accepting)	-.10	-.07	-.08
Presence felt by subject of embarrassing child- hood memories	.38***	.39***	.26*
Reticence (Factor 1)	.31**	.19	-.04
Sense of shame (Factor 2)	.10	.26**	.08
Sense of modesty (Factor 3)	.02	.16	.11
General psychological health (Epstein Per- sonality Inventory)	-.25*	-.18	-.01
Sex (1: male; 2: female)	-.05	.21*	.18
Age	-.11	-.13	-.03

Note: Two-tailed significance tests are used.

* $p < .05$

** $p < .01$

*** $p < .001$

three items from the questionnaire on blushing, the three embarrassability factors, the average Epstein Personality Inventory dimension, and sex and age of the subject.⁹

Before examining the data in Table 17, we should briefly consider the nature of the three blushing variables in the study. While all concern blushing, these three variables are of unequal theoretical interest; clearly "overall incidence of blushing" is the most general and important one. In fact it definitely subsumes "incidence of solitary blushing" in its measurement, while "anxiety anticipating blushing" may or may not be directly subordinate to it. Because of these considerations we must initially treat the results in Table 17 with suspicion. As we would expect, the "anxiety" variable is significantly correlated with "overall incidence of blushing" ($r(98) = .40$; p (two-tailed) $< .001$), as is "incidence of solitary blushing" ($r(98) = .49$; p (two-tailed) $< .001$).¹⁰ Perhaps the significant correlations listed in Table 17 for these two subordinate variables merely reflect their relationships with the more general blushing rate measure. The next table presents data on this point.

⁹Age is an ordinal level variable in this study but is included in these correlational analyses for the same reasons as recency of the blushing incident was also included in correlational analysis (see Footnote 7).

¹⁰The correlation between the two subordinate blushing variables is also significant ($r(98) = .26$; p (two-tailed) $< .01$).

Table 18 gives first-order partial-correlations between the two subordinate blushing variables and the other variables. These correlations are based on the partialing out of the "overall incidence of blushing" variable, and as such, each is essentially the Pearson correlation between the residual or error scores resulting from the prediction of the paired variables from their correlations with that variable (Nunnally, 1967). We are particularly interested in whether any significant zero-order (Pearson) correlation in Table 17 shows up in the present analysis as non-significant. Such a finding would vitiate the meaningfulness of the significant zero-order correlation by revealing its basis in the respective paired variables' association with the overall blushing rate measure.

Of immediate note is the fact that no significant results now appear in the data for solitary blushing. This confirms the variable's subordinate status, and we will concern ourselves with it no longer. However, Table 18 also indicates that, even with the effects of measuring the overall blushing rate partialled out, important relationships still exist between the subject's anxiety anticipating blushing and other variables. The same significant findings emerge as appeared in the previous table, although they are of lesser statistical magnitude.

Returning our consideration to Table 17, we should now note what the findings revealed there are. Both

Table 18

First-Order Partial-Correlations, with "Overall
Incidence of Blushing" Partialled Out

<u>Variable</u>	First-order Partial-correlation	
	<u>Subject's anxiety anticipating blushing</u>	<u>Incidence of solitary blushing by subject</u>
Incidence of blushing among family members	.21*	.08
Parental style (demanding - accepting)	-.08	-.06
Presence felt by subject of embarrassing child- hood memories	.26**	.08
Reticence (Factor 1)	.26**	-.16
Sense of shame (Factor 2)	.00	-.07
Sense of modesty (Factor 3)	-.04	.04
General psychological health (Epstein Personality Inven- tory)	-.20*	.09
Sex (1: Male; 2: Female)	-.15	.09
Age	-.06	.04

Note: Each partial-correlation represents the association between the paired variables, controlling for the effect of the "overall incidence of blushing" variable. One-tailed significance tests are used (df = 97).

*
p < .05

**
p < .01

p < .001

anxiety anticipating blushing and overall incidence of blushing are strongly associated with blushing among family members and embarrassing childhood memories. However the first of these variables is also correlated with the general embarrassability factor we have termed "reticence" and is negatively correlated with the psychological health measure derived from the Epstein Personality Inventory. The second of the variables, concerning the overall incidence of blushing, is correlated with the second embarrassability factor, the sense of shame, and, as we have already seen, is significantly higher on the average among females than males.

These results are interesting ones, and much can be said about them. However they need further explication because they fail to take into account the associations between the different variables which have been correlated with the blushing variables. To this end regression analysis was undertaken separately for the two variables.¹¹ The results of these analyses are given in Tables 19 and 20.

¹¹The SPSS stepwise regression subprogram was used. Default parameters were employed, providing for a liberal standard for inclusion in the equation ($F \geq .01$) and a stringent standard for removal ($F \leq .005$). However, in both analyses the variables which ultimately proved to be the significant predictors in the equation were statistically significant at each step of the analysis. That is, none of these predictor variables would have been removed from its regression equation had the standard for removal been less stringent.

Table 19
Stepwise Regression Analysis on
Anxiety Anticipating Blushing

<u>Variables</u>	<u>Beta</u>	<u>b</u>	<u>SE</u>	<u>F</u>
Presence felt by subject of embarrassing childhood memories	.23	.20	.09	5.08*
Incidence of blushing among family members	.32	.32	.10	9.48**
Reticence (Factor 1)	.10	.15	.15	.93
General psychological health (Epstein Personality Inventory)	-.20	-.49	.29	2.86
Sense of shame (Factor 2)	-.16	-.22	.15	2.04
Age	-.09	-.08	.08	.84
Parental style (demanding - accepting)	-.10	-.09	.09	.99
Sense of modesty (Factor 3)	-.04	-.06	.13	.20
Sex (1: Male; 2: Female)	.01	.02	.23	.01

Note: Variables appear in the table in the order in which they were entered in the regression equation. For the overall equation, $F(9,90) = 3.90$, $p < .001$, $R^2 = .28$, $SE = 1.08$, and the constant term = 2.90.

* $p < .05$

** $p < .01$

*** $p < .001$

Table 20
Stepwise Regression Analysis on Self-
Reported Overall Incidence of Blushing

<u>Variable</u>	<u>Beta</u>	<u>b</u>	<u>SE</u>	<u>F</u>
Incidence of blushing among family members	.40	.37	.09	17.33***
Presence felt by subject of embarrassing childhood memories	.24	.19	.08	6.24*
Sex (1: male; 2: female)	.27	.60	.19	9.44**
Sense of modesty (Factor 3)	.13	.16	.11	2.13
Sense of shame (Factor 2)	.08	.09	.13	.52
Parental style (demanding - accepting)	-.06	-.05	.07	.44
Age	-.04	-.03	.07	.23
General psychological health (Epstein Personality Inven- tory)	-.04	-.09	.25	.14
Reticence (Factor 1)	.01	.02	.13	.02

Note: Variables appear in the table in the order in which they were entered in the regression equation. For the overall equation, $F(9,90) = 6.10$, $p < .001$, $R^2 = .38$, $SE = .91$, and the constant term = 1.31.

* $p < .05$

** $p < .01$

*** $p < .001$

The Tables reveal that in a multivariate prediction task only three variables are important predictors of the subject's overall incidence of blushing and that two of these same variables are also significant predictors of felt anxiety anticipating blushing. The two common variables are "incidence of blushing among family members" and "presence felt by subject of embarrassing childhood memories"; the sex of the subject is the third significant predictor variable for overall incidence of blushing. None of the other three significantly correlated variables, each of which is much more related to the contemporary psychological make-up of the subject than the variables which remain, is a significant predictor in a multivariate context.

What this portion of the research results leaves us with are the following implications. If one wants to predict the tendency toward blushing in the college-age subject, all that must be known is the tendency in the subject's family toward blushing, the extent and longevity of the effects of childhood suffering of embarrassment, and the sex of the subject. These three things will give as reliable a prediction as any combination, large or small, of variables drawn from this study. However, prediction aside, the results indicate that one tends to find that frequent blushers, on the broad average, harbor thoughts of which they are abashed and secretive; and they can be

too concerned with what others think of them.

If one wants to predict whether an individual is concerned or anxious about blushing, the best prediction this study provides rests on just two of the three issues above: the incidence of blushing in the subject's family and the presence of embarrassing childhood memories. Beyond this, however, one tends to find that those few individuals who are anxious about blushing are somewhat timid in nature and suffer from a less than healthy personality.

C H A P T E R IV

DISCUSSION

Let us restate the five research topics we set forth when we began this study: 1) situations eliciting blushing, 2) personality variables affecting blushing, 3) a sex difference in the propensity to blush, 4) age differences in blushing, and 5) the inheritability of the response. Of the two sets of data in the study, one derived from the blushing reports and the other from the questionnaire on blushing and the Epstein Personality Inventory, the first set concerns situations eliciting blushing and the second concerns the remaining four research topics.

Situations Eliciting Blushing

The self-report methodology with which we have sampled blushing incidents has been a productive one; it has yielded results of two sorts: normative frequency distributions and statistics associating various features of blushing incidents with each other. However, since the sparse previous research on blushing left a vacuum of empirical data, the usefulness of these results is somewhat limited. Because we cannot refer to previous work for anything but the most general notions of what to expect, the results must be interpreted in a tentative fashion.

The prime example of this is the frequency distribution for coding item 1 (Table 2). Certainly it is interesting that the majority of the subjects' reports include bodily reference, but is it surprising? Likewise, is it surprising that 40% of the cases with bodily reference concern sexual topics specifically? We have stated that both Partridge and MacCurdy thought that sexuality was often the cause of embarrassment, but would they have considered the 40% figure high or low?

It is obvious that this evaluation is too close and that we must interpret our results in some more general context. Nevertheless, previous literature may yet guide us. Specifically, Darwin's work (op cit) may be of service because he implicated an overriding element of self-attention in incidents in which blushing occurs. Self-attention is the end-result of many and varied types of social episodes; of necessity we self-attend whenever we present ourselves, either advertently or inadvertently, before the evaluative scrutiny of others. Perhaps the issue of self-attention can initially provide us with an appropriate thematic framework for our examination of the blushing incidents gathered by the present study.

Against this less specific theoretical background, we observe that, although the majority of blushing reports do indeed concern body selves, this majority is a small one (56%). Pursuing our new theme, this implies that the

body self is hardly the sole component of self-presentation, though it may be the original and most basic one. The case of F-38, who draws attention to her social competence with a mistaken introduction, is a good example of this.

Returning to the issue of sexuality, we are able to add needed perspective to MacCurdy's and Partridge's remarks by noting that, even confining our interest solely to blushing reports with some form of bodily reference, only a minority of the reports follow a sexual story line. Drawing from the majority of cases, simple clumsiness, as lamented by M-37, is an example of how one may draw attention, both of others and of oneself, to one's self; so is the matter of appearance and grooming, as in F-32's weight loss or M-5's need of a haircut.

Table 3 contains data on the recency of reported blushing incidents. We repeat here the fact that a substantial number of subjects, over one-third, drew on incidents less than a week old for their narratives. This implies that blushing is a relatively common occurrence in everyday social interaction. This is hardly a revelation, but it requires restating given the neglect which the response has received.

If self-attention is the overriding psychological element mediating blushing, then Table 4 contains data on this issue, for self-attention takes one of its most dramatic forms when a blusher is directed by others to heed his

response. Surely this is what Partridge referred to when he asserted, however illogically, that "attention called to the blush" is an important cause of the response. What he meant of course is that notification that one is blushing only redoubles and exasperates the self-attention which originated the response, thus intensifying the blushing. Herein lies the anathematic paradox in blushing: just at the point when outward composure is most actively sought, the blush signals to others unequivocally that it is missing. When others remark on the blush this reaffirms for the subject his conviction that momentary self-control is utterly and tragically lost.

Several of the 35 subjects who were told of their blushing make this frustrating paradox clear in their narratives. Thus F-6, while trying to conceal her agreement with a compliment comparing her with her coworkers, is told, "see, you're telling a lie, you're blushing." A similar predicament was experienced by M-49, whose anonymity as his paper is read before a class is shattered by his vivid blushing. M-10 describes the typical response in such a situation when he writes, "when my friend said, 'Oh, he's blushing,' I blushed even more."

Considering next the content areas of the 98 blushing reports, it is worthwhile to recall the five examples we have already cited of the most frequently occurring categories. Each example has something to teach. The first

subject (M-34) blushed at his failure on a test; but he notes significantly, "I...was sure the people sitting next to me saw the grade." This amplified the debasement of his intellectual worth by giving it a public forum. The attention of others is the essence of another blusher's dilemma (M-17) when he is denuded by a boisterous party-goer before a mixed crowd. This time however the subject's predicament is entirely someone else's doing, though we can guess that the perpetrator's design is one of fun. This is not the case for the unfortunate "teacher's pet" (F-44), whose evident good will is maliciously deflated by a classmate. A fourth blusher's feminine sensitivity (F-24) is taken advantage of in the vicarious sex-play of her boyfriend's fellows, all of which reaffirms the powerful effect of sexuality in embarrassment and in all psychology. The fifth example (M-50) is in a sense opposite to the other four because it concerns the paradoxical pique of admiration well-meant. The embarrassment which this successful medical school applicant feels is hardly unexpected or unusual, but it is none the less basically self-sacrificing.

Out of these examples, and others readily at hand among the reports, we learn that embarrassing attention can be drawn to an individual in a wide variety of ways. All of these narratives are convincingly true-to-life, but they express diverse social motifs. Is the blusher's

embarrassment an accident of his own fault or the successful result of someone else's purposeful design? If to some purpose, is that purpose gregarious, hurt-seeking, status-seeking, or merely the corrective intent of an honest critic? Is the issue some twist of everyday subject matter or some social taboo? Does the embarrassment subside as quickly as it came, or does it reverberate in the social arena? The blushing reports can illustrate any and all of these, which after all represent the variegated fabric of day-to-day social interaction in general. Blushing is found here to be a common response to disparate situations.

Blushing is a social response, as the results in Table 6 prove. More often than not blushing occurs in group settings of four or more people. As a rough rule the more pairs of eyes whose gaze may fall on the subject, the greater the potential for embarrassment and blushing.

Table 7's data address an issue we just touched on, namely the presence and motivation of provocateurs of the subject's blushing response. Probably the most poignant of the blushing episodes, illustrating the essence of debilitating ridicule, is that of F-31. Starting her narrative with the straightforward assertion, "I don't like speaking in class," F-31 describes how "one day I got brave and gave an answer. Everyone looked at me, and the professor said, 'Oh, the pole speaks,'" referring to the

concrete beam beside her. She closes her story with the unfortunate note, "I never spoke in that class again." In this example derision is abetted with painful effectiveness by social scrutiny ("everyone looked"), depersonalization ("the pole speaks"), and by the incontrovertible authority and status of the professor. We can only guess at the latter's motivation; no reasonable intention whatever suggests itself.

While extreme, F-31's case captures the potential danger of even the most jovial teasing. M-42 illustrates this when he relates how as an 11- or 12-year-old he was stripped of his pajamas in some raucous family play. He writes, "I felt humiliated and ran away."

These two cases are cited here because they clearly reveal the dynamics of ridicule. Most subjects of course do not share these two blushers' more pronounced sensitivity, and many more examples can be mustered whose results are happy ones. These examples, as of M-39, M-45, F-3, and F-8, make it apparent that good-natured teasing is a part of the inherent gregariousness of the human animal. Thus F-3's reaction to the funning she receives is typical, "because most of the people were my friends, I just laughed with them."

F-3's response typifies as well the self-deprecatory direction taken by most of the subjects' active responses to their embarrassment and blushing. Some responses

succeeded in abnegating the embarrassment, and some did not. Since F-3 proceeded to tear a hole in her dress while joining in her friends' laughter and removing the garment's price-tag at the same time, she worsens her predicament rather than betters it. In fact Table 8's results indicate that only a small minority (19) of the blushers were judged to have extricated themselves from their dilemma; a much larger number (41) did not even make the attempt. These data indicate that the lack of composure which blushing is often taken by observers to indicate is usually quite real. For a blusher to be disconcerted is the rule rather than the exception.

On to the statistics associating various features of blushing incidents with each other. As we have already seen, some of these statistically significant relationships are more easily interpreted than others. Let us list the relationships once more.

Positively correlated

Specifically sexual reference	with	notification of blushing
Physical exposure	with	bodily reference
Psychological exposure	with	specifically sexual reference
Psychological exposure	with	notification of blushing
Other content	with	specifically an adequate response
Ridicule	with	bodily reference

Ridicule	with notification of blushing
Ridicule	with group setting
<u>Negatively correlated</u>	
Physical exposure	with specifically sexual reference
Inadequacy	with bodily reference
Approval	with specifically sexual reference
Approval	with ridicule
Group setting	with response by subject

Three of these relationships were later qualified by the finding that they hold only for females and not for males. Again these are the following: "other content" with "specifically an adequate response," "ridicule" with "group setting," and "approval" with "ridicule." We shall consider these too, as we go along.

The first of the relationships, wherein subjects whose reports include bodily reference are shown to be more liable to notification about their blushing if the bodily reference is specifically sexual in nature, has already stymied our first efforts at explication. We will give it more complete consideration here, examining specific blushing reports to clarify how this association comes about.

How it comes about seems to have to do with sexual references taking two discernible forms in the reports, one consisting of the exploitation of sexuality as a taboo,

and the other consisting of references to actual sexual behavior. The first such reference seems to happen more often than the second, and it is quite frequently accompanied by notifications of blushing when blushing appears, so frequently in fact that this accounts for the positive correlation between notification and sexual references in general. Thus when the sex taboo is violated and subjects are questioned tentatively or are teased without basis about their sexual behavior, blushers will often be told about their response, significantly more often than if bodily reference of some other nature exists in the situation. But when, much more rarely, actual sexual activity is at issue, that is, when the sexual connotations of the incident are more serious and more direct, blushers will rarely be told that they are blushing.

Let us consider some specific blushing reports on this question.¹² Of the 14 subjects whose cases include sexual reference who are told they are blushing, three (M-6; F-33 and 46) are teased about sexual intimacy they had not experienced, two (M-21 and F-14) are publicly flirted with in jest by individuals they hardly know, two (F-24 and 48) are teased about the incipient sexuality of single-date

¹²The 14 cases including both sexual reference and notification of blushing are M-6, 11, 12, 21, 25, 38, and 45, and F-4, 14, 24, 28, 33, 46, and 48. The 8 cases with sexual reference and no notification are M-14, 31, and 40, and F-1, 7, 30, 41, and 42.

relationships, and two (M-11 and 12) are forced to parry unexpected questions about their sexual experience. In contrast, of the 8 subjects whose cases include sexual reference who were not told that they are blushing, two (M-14 and F-12) are accurately accused of actual sexual couplings with known parties, one (M-40) witnesses a pair of lovers in bed, one (a female; F-30) is blatantly ogled while swimming, one (F-1) is reminded by friends of her move to disrobe while drunk at a party, and one (F-41) accidentally witnesses the nudity of the opposite sex. It is clear that the tone of these latter reports is more serious and more directly sexual than are the others.

What seems apparent here is that, whereas sexual reputation is inherently a public commodity, sexual activity is much more private. Thus distress or shame about the latter may be assumed to be greater than about the former, which is taken less seriously. Since notification about blushing often aggravates the blusher's distress, what we have found here is that notification rarely occurs when actual sexuality is at issue but frequently occurs when sexual reputation is at stake. In fact it occurs more frequently in cases concerning sexual reputation than in cases concerning non-sexual references to the body self. This only implies that many non-sexual bodily references violate privacy and distress the individual just as references to intimate sexuality do. This is in fitting with

the personal nature of many non-sexual bodily references in the reports, to anality for example, or to unconquerable physical clumsiness.

After such involved consideration of one significant relationship between blushing report features, we would obviously hope that the other twelve such relationships we have listed will be easier to discuss. Happily this is so. Indeed the second relationship, between physical exposure and bodily reference, is obvious enough to warrant no further comment.

Two findings concerning psychological exposure link that content area to the now familiar blushing incident features, sexual reference and notification of blushing. This reflects the fact that 10 of the 14 cases we have already examined which combine these two features were rated "psychological exposure" in their content, as were three of the eight cases with sexual reference and no notification. The sexuality of the subject, either reputed or actual, is a most integral part of his or her psychology, especially during the years of young adulthood. People are more likely to feel "psychologically exposed" when their sexuality is the topic of public conjecture than to react in any other way.

The overall association of adequate responses with incidents whose content does not fall into one of the four major classes is peculiar and, in fact, deceiving. In the

total of 57 cases with responding by the subject, only five (M-40 and 48; F-5, 28, and 41) concern "other content." What this statistical relationship reflects is that there is a strong association between the occurrence of the four major content area classes and making an inadequate response. In other words cases rated as physical or psychological exposure, inadequacy, or approval are much more likely to include inadequate responses than adequate ones (the ratio is actually 37 to 15). However since we already know this from the normative data we have examined (where the overall ratio is 38 to 19; see Table 8), we can safely conclude that we have before us an unimportant, purely statistical relationship based on the low number of "other content" cases. Moreover with the same reasoning, we can dismiss the fact that the correlation between these two features among males is negligible while it is significant among females. This results from all three of the female "other content" cases showing adequate responses while only one of the two male cases does, hardly a noteworthy trend.

The findings concerning ridicule are interesting and informative. As we have already noted, we might have guessed that telling the subject that he or she is blushing would be a logical extension of ridicule; the reports abound with examples of this (M-6 is one). But what about the association between ridicule and bodily reference? This relationship reflects the fact that the body self is

the original and most basic component of self-presentation; and if the ridicule of the subject is intended, whether from fun-seeking or hurt-seeking, the body self is the most vulnerable. Thus a large number of the 36 cases¹³ in which these features occur together read like a litany of the ridiculous; F-3's dress-tearing incident, already considered, is an example of this. Other cases, as in the several invasions of sexual privacy we have also considered (M-14; F-1, and 30), illustrate the malice which can motivate teasing, and which finds a ready mark in the body self of the subject.

Moving on, what about the association between ridicule and group setting. More especially why is it that one sex (female) shows this and the other does not. We have speculated that ridicule is in general more strictly sanctioned towards women than men, but closer examination of the actual cases reveals a subtler explanation. This explanation can be presented most easily by considering the 31 cases in which blushing occurs with only one or two other people present.

Out of the 31 cases, 20 can be gleaned¹⁴ which involve the subject in "boy-girl" interaction of one sort or another.

¹³M-1, 3, 6, 8, 11, 12, 14, 17, 18, 21, 22, 26, 30, 31, 37, 41, 42, 43, 44, and 45, and F-1, 3, 4, 12, 13, 14, 19, 24, 25, 28, 30, 33, 35, 41, 46, and 48.

¹⁴M-8, 10, 11, 15, 22, 23, 25, 31, and 43, and F-7, 15, 21, 23, 27, 30, 32, 36, 38, 45, and 49.

Most of these interactions are between boyfriend and girlfriend but not all. A curious pattern emerges among the cases. Of the nine males interacting with the opposite sex, only three (15, 23, and 25) avoid the brunt of teasing during their embarrassment. On the other hand, however, only two (27 and 30) of the eleven females are teased in any way.

The cases of M-11 and F-7 illustrate this striking phenomenon. When both of these subjects engage in vague discussions of sexuality with their respective dating partners and the conversation takes too intimate a turn, M-11 is teased when he evidences his embarrassment in blushing, but F-7 is not.

The pattern of two opposite trends among cases with boy-girl interaction is vitiated in the total data pool, but it still seems interesting enough to note and is as good an explanation of the difference in correlations between sexes as any other suggested by the cases. Briefly the pattern implies that in boy-girl interactions the embarrassability of females is tested by ridicule less than the embarrassability of males, perhaps because girls' embarrassability is popularly supposed to be greater.

The first negative correlation in our list, between physical exposure and sexual reference among cases with bodily reference, may at first seem surprising. It is not at all, however, for it only reflects the fact that in

contemporary American culture nudity or near-nudity is not inherently sexual; neither of course are anal functions. Only one of the 14 cases of physical exposure, that of the swimmer (F-30), has a sexual theme; all of the rest¹⁵ do not, and M-29's arrest for "streaking" illustrates this nicely.

The next relationship, wherein bodily reference is found to be uncommon in cases of the subject's inadequacy, stems from the composition of the "inadequacy" content class, the most frequently occurring class among the reports. Only five of the 39 cases of inadequacy (M-18, 30, 37, and 44; F-13) are cases of physical awkwardness, and obviously all of these include bodily reference. However the 34 remaining cases consist of social awkwardness, and intellectual and moral failure; and as might be expected only a few of these (eight) also include bodily reference.

The first finding with respect to approval cannot be considered unusual. This is approval's negative correlation with "specifically sexual reference" in cases with bodily reference. Certainly when bodily reference is made in an incident and the attitude of others toward the subject is approving, there is no logical reason why sexuality could not be at issue, but in none of the six cases (M-3, 36, and 41; F-17, 32, and 43) among the reports was it

¹⁵M-1, 9, 13, 17, 22, 29, 33, 42, 43, and 46, and F-12, 21, and 35.

judged to be so. This reflects the fact that four of these reports concern physical attractiveness; and just as nudity or near-nudity is not inherently sexual, neither is physical attractiveness.

The second finding about approval, its negative correlation with ridicule, is complicated by the fact that it holds for women but not for men. We have already conjectured that this might be due to a slight tendency for men to be teased while receiving approval while women are not. This would be a second example of ridicule toward women being sanctioned more strictly than toward men. On this issue let us examine the 11 cases of approval¹⁶ in the data.

Looking at the cases our conjecture finds little support. Rather, different themes of approval seem to occur in different cases. Thus, for outright achievement, in the Arts (M-16; F-43), in scholastics (M-50; F-17), or in personal betterment (F-32), ridicule does not temper any compliments received. Neither does it accompany simple demonstrations of affection (F-15). However in public flirtation (M-3, and 41) or in flattery (M-47), ridicule emerges. Thus the data do not confirm our conjecture, implying that the presence of ridicule depends on the nature of what is being approved. Nevertheless it is important to

¹⁶M-3,16,36,41,47, and 50, and F-15,17,32,40, and 43.

note that the data are sparse on this point and that flirtation and flattery are not represented among the female cases.

The final significant negative correlation, between group setting and responding by the subject, is interesting. Blushing individuals are evidently less likely to try to lessen their plight when in groups than with only one or two others present. This shows how powerfully intimidating a group setting can be.

A prime example of the effect of group setting is provided by M-35, who was unprepared when called upon in a high school class. M-35 writes, "it felt like everyone was staring at me and laughing at me. I was so embarrassed that I found it hard to talk to my classmates for the rest of the day." The case of M-32 reiterates this theme. His report describes his chastisement for creating a disturbance in a college lecture, and he relates, "I could feel 200 eyes staring right at me and all that attention made me uncomfortable."

Neither M-35 or M-32 makes any response while embarrassed before their respective classes. For these two blushers the social organism is a living thing and far be it for them to try to cope successfully with it.

A summary is in order of what we have learned about situations eliciting blushing from our examination of the

statistical relationships between various blushing incident features. We have discerned some interesting patterns, to wit:

Individuals who blush from embarrassment about sexual reputation are liable to be told that they are blushing; when the situation eliciting blushing refers to other aspects of the body self, including actual private sexuality, they are not.

Sexual references strike more consistently at the psychological balance of the individual than do other references to the body self.

When ridicule or teasing results in blushing, telling the blusher of his response is a logical extension of the ridicule.

References to the body self form a more ready avenue for the ridicule of an individual than do references directed to his other aspects.

A trend exists for boy-girl interactions, as between dating partners, to more often include teasing directed at the boy than at the girl.

Even in its more extreme degree, public exposure of the body does not carry sexual connotations in today's American culture.

A group setting has a powerfully intimidating effect on embarrassed blushers, more so than intimate settings.

Personality Variables Affecting Blushing

This study has been concerned with the normal manifestations of blushing at embarrassment, neglecting the abnormal. Yet it is reasonable to assume that, whatever our specific interest in blushing, individuals would be present in the subject pool who suffer from what Burgess (op cit) called a "morbid sensibility" about blushing and what psychoanalysts term "erythrophobia." At least the results of the study point in this direction.

We may base this conclusion on two aspects of the data, the resilience of the "anxiety anticipating blushing" variable toward the partialing out of the effect of the overall blushing rate, and the nature of the significant correlations between the "anxiety" variable and several personality variables in the study.

What after all is implied by an individual's endorsement of the statement "I often worry before a situation that I might blush in it"? Not implied is that the individual blushes frequently, though our statistics indicate that this is likely to be so. Rather what is implied is that the person is inordinately sensitive to a future prospect, wholly unsure, of displaying a response which may or may not be noticed by those around him. For such an individual, blushing must be in a sense its own punishment, whatever its social consequences; and even if he or she actually blushes rarely, we may expect that

anxiety accompanies and even anticipates the response.

The "morbid sensibility" of the unfortunate individual just described would have to be considered irrational, unhealthy, and likely to be a component in a more general fear of inadequate self-control. Clearly, all of this betokens a shrinking from the necessity of self-presentation and a continuing erosion of the personality structure.

After this speculation the fact that the association between an unhealthy anxiety about blushing and various personality variables holds for all degrees of the blushing propensity only illustrates the irrational nature of the anxiety. This is the substance of the results from Table 18 of this study.

We have reasoned out that anxiety anticipating blushing is associated with a reluctance towards self-presentation and a maladaptive personality structure. The correlational data in Table 17 support these notions. Both the basic embarrassability factor "reticence" and the general psychological health index from the Epstein Personality Inventory correlate significantly with the "anxiety" variable.

If some evidence indicates that the "anxiety anticipating blushing" variable taps the abnormal in matters of blushing and personality in general, other evidence suggests that the "overall incidence of blushing" variable is much

more relevant to our stated interest in the normal. The overall blushing rate measure is a robust variable on whose five-point scale only five of 100 subjects asserted that they "never blush." Its median value of 2.75 indicates that blushing is both a common enough everyday response and in some subjects a frequent one.

Blushing may be clearly a normal response, but it appears to be "more normal" for some than for others. Specifically the sense of shame, as quantified in this study's second embarrassability factor, is positively associated with the propensity to blush in our college subjects. Thus individuals tending a little more than most to be vigilant against the disapproving thoughts of others and indeed to be disapproving of their own ideas and impulses report themselves more inclined towards blushing than the more typical subject does. However this is the only personality variable of four which correlates significantly with the propensity to blush.

Our consideration of the personality variables affecting blushing takes a new turn when the data from this study's regression analyses are brought to bear on the issue. Three personality variables have been shown in psychologically meaningful relationships with our two blushing measures, "anxiety anticipating blushing" and "overall incidence of blushing," but all three variables

pale in importance when pitted against several more basic variables in a multivariate context. This is one of the more interesting findings of the study, and it brings us to the final stages of this paper.

Other Research Topics

Only three significantly correlated variables stand up to the multiple regression prediction task, sex of the subject, "incidence of blushing among family members," and "presence felt by the subject of embarrassing childhood memories." These three variables contain what predictive power our personality variables had and more. Let us consider why this would be so.

What makes the regression analysis so interesting is that it seems to concern more basic components of psychological character than reticence or shame, even than general psychological health. Rather it directly concerns the earliest building blocks of the subject's present-day personality, namely his genetic make-up and his early socialization.

To a large extent, genetic make-up and early socialization are inextricably linked as far as the present study goes. We have learned that, despite Feldman's contradiction (op cit), the female subjects blush more frequently than the males. However we cannot tell whether this has a specific physiological basis or whether it is just that the socialization of blushing proceeds along sexually stereotypic

lines. Neither do we know whether blushing's apparent inheritability in our subjects, as evidenced in the significant correlation between their propensity to blush and that of their family's, is actually genetically mediated or is conditioned through learning. If we accept the general rule in Psychology today we may surmise that both of these relationships stem from interaction of nature and nurture.

There remains one variable however which is less easily dismissed, namely that derived from the degree of endorsement with the questionnaire statement "some embarrassing childhood incidents still make me feel so uncomfortable to recall that I force myself not to think about them whenever I remember them." Subjects for whom this is strongly the case blush more frequently by their own report than do subjects for whom it is not. Moreover, since the variable's reference to childhood allows more powerful prediction of the propensity to blush or to be anxious about blushing than any personality variables derived from the subject's present-day psychology, it nicely underscores the childhood origins of those present-day personality traits of reticence, shame, and overall maladaptive orientation. In other words the embarrassable or insecure subjects in this study, the ones who are more likely to blush or be anxious about blushing, are the ones who have been embarrassed all their lives. This result is hardly surprising,

but as one of the stronger findings to have sifted down through the study's methodology, it surely requires that adequate note be taken of it.

Conciusion by Caveat

We will bring this brief contribution to a close with an important caveat. Nowhere in the data we have reviewed has a noteworthy finding emerged which links the age of the subject to any other variable. However this can hardly be taken to mean that important age differences may not apply to the phenomena we have researched. What we have found may actually be uniquely bound to the narrow age group from which subjects have been drawn. These data do not relate to Darwin's remark (op cit) that "the young blush much more freely than the old," although it is hoped that they have contributed to knowledge of how freely--and why--the young blush.

References

- Anderson, N.H. Scales and statistics: parametric and non-parametric. Psychological Bulletin, 1961, 58 (4), 305-316.
- Apsler, R. Effects of embarrassment on behavior toward others. Journal of Personality and Social Psychology, 1975, 32 (1), 145-153.
- Armstrong, W.D. The social functions of embarrassment (Doctoral dissertation, University of Michigan, 1974). Dissertation Abstracts International, 1974, 35, 2479B. (University Microfilms No. 74-25, 138)
- Ausubel, D.P. Relationships between shame and guilt in the socializing process. Psychological Review, 1955, 62 (5), 378-390.
- Blurton-Jones, N. An ethological study of some aspects of social behaviour of children in nursery school. In D. Morris (Ed.), Primate ethology. London: Weidenfeld & Nicolson, 1967.
- Blurton-Jones, N. Criteria for use in describing facial expressions in children. Human Biology, 1971, 41, 365-413.
- Brannigan, C.R., & Humphries, D.A. Human non-verbal behaviour, a means of communication. In N. Blurton-Jones (Ed.), Ethological studies of child behavior. Cambridge: University Press, 1972.

Burgess, T.H. The physiology or mechanism of blushing.

London: Churchill, 1839. (Available in the University of Pennsylvania's Rare Book Collection)

Cannon, W.B. Bodily changes in pain, hunger, fear and rage (second edition). New York: Harper & Row, 1929.

Connolly, K., & Smith, P.K. Reactions of pre-school children to a strange observer. In N. Blurton-Jones (Ed.), Ethological studies of child behaviour. Cambridge: University Press, 1972.

Cronbach, L.J. Coefficient alpha and the internal structure of tests. Psychometrika, 1951, 16, 297-334.

Darwin, C. The expression of the emotions in man and animals. London: John Murray, 1872. Reprinted Chicago: University of Chicago Press, 1965.

Duncan, S., Jr. Nonverbal communication. Psychological Bulletin, 1969, 72 (2), 118-137.

Ekman, P. A methodological discussion of nonverbal behavior. The Journal of Psychology, 1957, 43, 141-149.

Ekman, P. Communication through nonverbal behavior: A source of information about an interpersonal relationship. In S.S. Tomkins & C.E. Izard (Eds.), Affect, cognition and personality. New York: Springer Press, 1965.

Ekman, P., & Friesen, W.V. Nonverbal behavior in psychotherapy research. In J.M. Shlien (Ed.), Research in psychotherapy (Volume 3). Washington: American Psychological Association, 1968.

- Ekman, P., & Friesen, W.V. The repertoire of nonverbal behavior: Categories, origins, usage, and coding. Semiotica, 1969, 1 (1), 49-98.
- Ekman, P., & Friesen, W.V. Measuring facial movement. Environmental Psychology and Nonverbal Behavior, 1976, 1 (1), 56-75.
- Ekman, P., Friesen, W.V., & Ellsworth, P. Emotion in the human face. New York: Pergamon Press, 1972.
- Ekman, P., Friesen, W.V., & Tomkins, S.S. Facial affect scoring technique (FAST): A first validity study. Semiotica, 1971, 3 (1), 37-58.
- English, F. Shame and social control. Transactional Analysis Journal, 1975, 5 (1), 24-28.
- Feldman, S. On blushing. Psychiatric Quarterly, 1941, 15, 249-261.
- Garland, H., & Brown, B.R. Face-saving as affected by subjects' sex, audiences' sex and audience expertise. Sociometry, 1972, 35, 280-289.
- Goffman, E. Embarrassment and social organization. American Journal of Sociology, 1956, 62, 264-271.
- Goodhart, C.B. The evolutionary significance of human hair patterns and skin colouring. Advancement of Science, 1960, 17, 53-59.
- Grant, E.C. Human facial expression. Man, 1969, 4 (4), 525-536.

- Grant, R.T., & Holling, H.E. Further observations on the vascular responses of the human limb to body warming; evidence for sympathetic vasodilator nerves in the normal subject. Clinical Science (incorporating Heart), 1937, 3, 273-285.
- Gross, F., & Stone, G.P. Embarrassment and the analysis of role requirements. American Journal of Sociology, 1964, 70, 1-15.
- Hyndman, O.R., & Wolkin, J. The autonomic mechanism of heat conservation and dissipation. The American Heart Journal, 1941, 22 (3), 289-304.
- Kaufman, G. The meaning of shame: Toward a self-affirming identity. Journal of Counseling Psychology, 1974, 21 (6) 568-574.
- Kimber, D.C., Gray, C.E., Stackpole, C.E., Leavell, L.C., & Miller, M.A. Anatomy and physiology (15th edition). New York: Macmillan, 1966.
- Lewis, T., & Landis, E.M. Some physiological effects of sympathetic ganglionectomy in the human being and its effect in a case of Raynaud's Malady. Heart, 1929, 15, 151-176.
- Lewis, T., & Pickering, G.W. Vasodilatation in the limbs in response to warming the body, with evidence for sympathetic vasodilator nerves in man. Heart, 1931, 16, 33.

- Lord, F.M. On the statistical treatment of football numbers. American Psychologist, 1953, 8, 750-751.
- Lynd, H.M. On shame and the search for identity. New York: Harcourt, Brace & World, 1958.
- MacCurdy, J.T. The biological significance of blushing and shame. British Journal of Psychology, 1930, 21, 174-182.
- Masters, W.H., & Johnson, V.E. Human sexual response. Boston: Little, Brown & Company, 1966.
- McGrew, W.C. An ethological study of children's behavior. New York: Academic Press, 1972.
- Modigliani, A. Embarrassment and embarrassability. Sociometry, 1968, 31, 313-326.
- Modigliani, A. Embarrassment, facework, and eye contact. Journal of Personality and Social Psychology, 1971, 17 (1), 15-24.
- Mosteller, F. The mystery of the missing corpus. Psychometrika, 1958, 23 (4), 279-289.
- Nie, N.H., Hull, C.H., Jenkins, J.G., Steinbrenner, K., & Bent, D.H. SPSS: Statistical package for the social sciences (2nd edition). New York: McGraw-Hill, 1975.
- Noback, C.R. The human nervous system. New York: McGraw-Hill, 1967.
- Nunnally, J.C. Psychometric theory. New York: McGraw-Hill, 1967.

- Partridge, G.E. Blushing. The Pedagogical Seminary, 1897, 4 (3), 1897.
- Riezler, K. Comment on the social psychology of shame. The American Journal of Sociology, 1943, 48 (4), 457-465.
- Sattler, J.M. Embarrassment and blushing: A theoretical review. Journal of Social Psychology, 1966, 69, 117-133.
- Stevens, S.S. On the theory of scales of measurement. Science, 1946, 103, 677-680.
- Tinbergen, N. The study of instinct. New York: Oxford University Press, 1951.
- Tomkins, S.S. Affect, imagery and consciousness (Volume 1: The positive affects). New York: Springer Publishing, 1962.
- Weinberg, M.S. Embarrassment: Its variable and invariable aspects. Social Forces, 1968, 46, 382-388.
- Zimbardo, P.C., Pilkonis, P.A., & Norwood, R.M. The social disease called shyness. Psychology Today, 1975, 8 (12), pp. 69-70; 72.

Reference Note

1. Epstein, S. Epstein Personality Inventory. Unpublished test instrument, University of Massachusetts, December, 1972.

Appendix A

Research Syllabus on Blushing

Introduction:

This questionnaire investigates the kinds of situations in which people blush.

Part one of the questionnaire asks you to recall an actual situation in which you blushed; part two asks you to recall a situation you observed in which someone else blushed. Think back carefully on the two experiences you choose, and then do your best to adequately describe for the reader exactly what happened.

Part three of the questionnaire asks some general questions about yourself. Please mark your answer on the IBM sheet provided.

Part four of the questionnaire is optional. If you do not mind making yourself available for a follow-up interview, please give your name and address in this section. (Your answers to this questionnaire and any follow-up interview are completely confidential.) Part four also asks you to comment on this questionnaire. Your comments, however brief, would be most helpful.

Part One

Relate, as completely as you can, a situation in which you blushed.

Be sure to include a full description of the following: how the situation came about, how it "happened"; who was there (if anyone), how did you feel about them, and how did they respond to you; what would you have liked to have done in the situation, and what behavior did you actually carry out as a result of the experience.

Indicate how recently this situation happened. Your answer should also refer to how you came to realize that you were blushing in the situation.

Part Two

Write as complete a description as you have given in Part One, but relate a situation you observed in which someone else blushed.

Bear the same questions in mind in this section as you considered in your description for Part One. How did the incident "happen"? How did others respond to the person you observed blushing? How did you respond? What did the people involved do (if anything) to bring the incident to a close?

Part Three

The following are some general questions about yourself. Rate your answers on the scales provided, and then mark your IBM sheet accordingly. Work quickly, as your first impressions are generally your best ones.

1. I found recalling the experience related in Part One:

Made me feel uncomfortable	: <u> </u> : <u> </u> : <u> </u> : <u> </u> : <u> </u> :	Didn't bother me at all
	1 2 3 4 5	

2. I found recalling the experience related in Part Two:

Made me feel uncomfortable	: <u> </u> : <u> </u> : <u> </u> : <u> </u> : <u> </u> :	Didn't bother me at all
	1 2 3 4 5	

3. I am very sensitive to disapproval:

Strongly the case	: <u> </u> : <u> </u> : <u> </u> : <u> </u> : <u> </u> :	Hardly ever the case
	1 2 3 4 5	

4. Being complimented or praised by someone is embarrassing to me:

Strongly the case	: <u> </u> : <u> </u> : <u> </u> : <u> </u> : <u> </u> :	Hardly ever the case
	1 2 3 4 5	

5. I ask questions in class:

Often	: <u> </u> : <u> </u> : <u> </u> : <u> </u> : <u> </u> :	Hardly ever
	1 2 3 4 5	

6. I have feelings and impulses that I am deeply ashamed of:

Strongly the case	: <u> </u> : <u> </u> : <u> </u> : <u> </u> : <u> </u> :	Hardly ever the case
	1 2 3 4 5	

7. I often wonder what people are really thinking of me:

Strongly the case	: <u> </u> : <u> </u> : <u> </u> : <u> </u> : <u> </u> :	Hardly ever the case
	1 2 3 4 5	

Part Three (continued)

8. I dress:

Conservatively : 1 : 2 : 3 : 4 : 5 : "Modishly"

9. I often worry before a situation that I might blush in it:

Strongly
the case : 1 : 2 : 3 : 4 : 5 : Hardly ever
the case

10. The members of my family:

Blush easily
and often : 1 : 2 : 3 : 4 : 5 : Blush rarely
or never

11. I get very nervous when talking before a group:

Strongly
the case : 1 : 2 : 3 : 4 : 5 : Hardly ever
the case

12. I consider myself to be:

Introverted;
shy : 1 : 2 : 3 : 4 : 5 : Extroverted;
out-going

13. All in all, I'm quite satisfied with what I am:

Strongly
the case : 1 : 2 : 3 : 4 : 5 : Hardly ever
the case

14. My parents:

Tended to con-
stantly urge me
to improve on
my performance : 1 : 2 : 3 : 4 : 5 : Accepted my
accomplishments
unconditionally

15. I blush:

Often : 1 : 2 : 3 : 4 : 5 : Never

Part Three (continued)

16. I blush when I am completely alone:

Often : $\frac{\quad}{1}$: $\frac{\quad}{2}$: $\frac{\quad}{3}$: $\frac{\quad}{4}$: $\frac{\quad}{5}$: Never

17. When people speak well of me, I tend not to believe them:

Strongly the case : $\frac{\quad}{1}$: $\frac{\quad}{2}$: $\frac{\quad}{3}$: $\frac{\quad}{4}$: $\frac{\quad}{5}$: Hardly ever the case

18. If I were really to be myself, people wouldn't think well of me:

Strongly the case : $\frac{\quad}{1}$: $\frac{\quad}{2}$: $\frac{\quad}{3}$: $\frac{\quad}{4}$: $\frac{\quad}{5}$: Hardly ever the case

19. Some embarrassing childhood incidents still make me feel so uncomfortable to recall that I force myself not to think about them whenever I remember them:

Strongly the case : $\frac{\quad}{1}$: $\frac{\quad}{2}$: $\frac{\quad}{3}$: $\frac{\quad}{4}$: $\frac{\quad}{5}$: Hardly ever the case

Personal Data

20. What is your age?

18 & : $\frac{\text{less}}{1}$: $\frac{19}{2}$: $\frac{20}{3}$: $\frac{21}{4}$: $\frac{22 \& \text{more}}{5}$:

21. What class are you in?

: $\frac{\text{Fr.}}{1}$: $\frac{\text{Soph.}}{2}$: $\frac{\text{Jr.}}{3}$: $\frac{\text{Sr.}}{4}$: $\frac{\text{Other}}{5}$:

22. What is your sex?

: $\frac{\text{Male}}{1}$: $\frac{\text{Female}}{2}$:

Part Three (continued)

23. Rate your skin-coloring:

Light : $\frac{\quad}{1}$: $\frac{\quad}{2}$: $\frac{\quad}{3}$: $\frac{\quad}{4}$: $\frac{\quad}{5}$: Dark

Part Four

If you are willing to make yourself available for a follow-up interview about your responses to this questionnaire, please give your name and phone number.

Any further comments you have about blushing or about this questionnaire would be most appreciated. Thank you.

NAME: _____

PHONE #: _____

COMMENTS:

Appendix B

Epstein Personality Inventory

Please indicate how frequently you tend to have each of the following feelings. Work rapidly; first impressions are as good as any. The same item is never repeated, so there is no need to check for consistency. While there are similar items, they invariably have shades of differences.

Please do not mark this form. Write your answers on a separate answer sheet, using the following scale.

: 1 : 2 : 3 : 4 : 5 :
 ALMOST USUALLY NEARLY
 NEVER ALWAYS

1	secure	6	unrestrained	11	tired
2	alert	7	conflicted	12	adequate
3	in-command-of one's-fate	8	likeable	13	angry
4	spontaneous	9	incapable	14	unhappy
5	rejected	10	at-ease	15	joyous
<hr/>					
<hr/>					
16	affectionate	21	stimulated	26	nervous
17	frightened	22	"all-together"	27	vigorous
18	withdrawn	23	restrained	28	incompetent
19	resigned	24	disliked	29	calm
20	self-conscious	25	bewildered	30	happy
<hr/>					
<hr/>					
31	pleased-w-self	36	uninhibited	41	clear-minded
32	unworthy	37	unreactive	42	energetic
33	unafraid	38	free	43	fatigued
34	helpless	39	frustrated	44	capable
35	ashamed-of-self	40	loveable	45	furious

46	sad	51	pleased-w-one's- values or motives	56	unloveable
47	displeased-w-self	52	unspontaneous	57	confused
48	kindly	53	alive	58	tense
49	worried	54	blocked	59	competent
50	powerful	55	torn-in-differ- ent-directions	60	disorganized

61	relaxed	66	hopeless	71	singleness- of-purpose
62	cheerful	67	inhibited	72	appreciated
63	worthy	68	natural	73	organized
64	annoyed-with- someone	69	unfeeling	74	active
65	unthreatened	70	unrestricted	75	sluggish

76	inadequate	81	threatened
77	jittery	82	guilty
78	gloomy	83	moral
79	annoyed-w-self		
80	warm-hearted		

Appendix C

Blushing Report Coding Format

Item 1. Presence and Nature of Bodily Reference

- 1) No bodily reference
- 2) Unwanted bodily exposure
(including exposure of underclothing)
- 3) Anal functions
- 4) Sexual references or connotations
(specifically made)
- 5) Motor functions
(poise, physical agility or clumsiness)
- 6) Physical appearance or attractiveness; references to grooming

Item 2. Recency of Reported Blushing Incident

- 1) Not evident or not applicable
- 2) Within 24 hours
- 3) Within 72 hours
- 4) Within one week
- 5) Within one month
- 6) Within six months
- 7) Within one year
- 8) Earlier than one year, but after the subject's
tenth birthday
- 9) Earlier than the subject's tenth birthday

Item 3. Presence and Nature of Evidence of Having Blushed

- A. The subject states outright that he cannot think of an instance in which he blushed (1)
- B. The subject nowhere mentions blushing in the course of his narrative (2)
- C. The subject specifically states that he is very unsure as to whether his face reddened (3)
- D. The subject confidently asserts that he blushed during the reported incident, supporting his assertion with the following evidence:
 - 4) (No evidence cited, but the subject clearly believes that he blushed)
 - 5) "Because I was embarrassed"; "because one always blushes when one is embarrassed."
 - 6) Physiological cues; proprioceptive feedback from the facial area
 - 7) Social feedback; the subject was told that he was blushing
 - 8) Combination of proprioceptive and social feedback
 - 9) Other

Item 4. Content Areas (Note. all include anticipation)

A. Physical exposure

- 1) anal- physical functions
- 2) sexual - nudity, exposure of body parts, undergarments
- 3) other

B. Psychological exposure

(S's secrets revealed, unlike "moral failure" (see category 11 below) this refers to something from S's past)

S's private experience, behavior, personality, or information exposed or pried into. (Someone tells of S's sexual exploits, drinking episodes, or opinions that S does not want to have revealed. It does not matter whether what is revealed is true or invented. Thus, this content area includes S being teased for sexual exploits or drunkenness that did not occur.)

- 4) sexual implications
- 5) lying or deceit
- 6) antisocial behavior (stealing)
- 7) other

C. Inadequacy

- 8) social awkwardness (inadequacy in social interaction)
social blunder, faux pas, forgetting friend's name, messing up an introduction, saying or doing something that could embarrass others - actual occurrence or anticipation of any of these.
- 9) physical awkwardness or clumsiness
tripping, knocking over a lamp
- 10) intellectual failure (demonstration of incompetence or stupidity that does not implicate others)
not knowing the answer to a question

- 11) moral failure (S reveals, or is concerned about being judged as revealing, moral defect - unlike "lying or deceit" (see category 5 above) this is in the present) exhibits insincerity, dishonesty, selfishness, shyness, or some other defect in character or motivation. Includes S's anticipation of how S will be judged by others

D. Witnessing physical exposure of someone

12) sexual

13) other

E. S is exposed to someone else's private experience, behavior, personality, or information

S learns of someone else's secrets; insincerity, lying, immorality; includes S probing or inquiring into private life or behavior of O.

14) sexual

15) other

F. Unprovoked ridicule (16)

someone pokes fun at, ridicules, degrades S without adequate justification at the moment.

G. Made center of attention without intention to ridicule or degrade (17)

H. Flattery, admiration, approval (18)

includes giving and/or receiving presents or compliments with no negative implications, direct or indirect.

I. Disapproval in absence of demonstration of incompetence or inadequacy (19)

J. Discussion of interpersonal sensitive topics (20)
(Note - prying into S's personal life is scored as psychological exposure)

dirty jokes, engaging in or overhearing an embarrassing discussion involving sensitive topics, such as sex, anality. Does not include exposing or prying into S's private life.

- K. S states he/she is not sure of blushing (21)
(if so, none of the above are scored)
- L. Fits none of the above categories (22)

Item 5. Social Setting

- 1) Group of 3 or more
- 2) S alone
- 3) S and 1 or 2 others present

Item 6. Presence (at anytime) of Ridicule. Teasing,
being made fun of, being laughed at.

- 1) No embarrassment or ridicule
- 2) Embarrassment, but no indication of being laughed
at, teased, or ridiculed
- 3) Embarrassment and indication of being laughed
at, teased, or ridiculed

Item 7. Availability of Coping Response

- 1) Adequate face-saving response available for coping with situation that provoked blushing
e.g. laughter, S enjoys laughing with group
- 2) Inadequate response for saving face
e.g. leaving room, S laughs uncomfortably with group
- 3) No response
S is at a loss as to how to respond, or no response reported; e.g. teacher refers to S as "the pole is speaking."

Appendix D

Condensed Blushing Reports

The condensed blushing reports are listed by subject designation, which consists of a letter denoting sex (M: male; F: female) and a number from 1 to 50. Parentheses contain scores on coding items 1 through 7.

M - 1 (264-02-131)

in informal mixed social gathering of S's friends, participant publicly points out that S's pant zipper is not done up.

Everyone laughs.

S blushes, does up zipper, and laughs.

M - 2 (142-19-123)

with male friends at bar, S sees girl he had previously proclaimed his attraction for.

Friends tease S, eventually coaxing S into asking the girl to dance.

Receives polite rejection

S nowhere mentions blushing in his narrative.

M - 3 (647-18-133)

in informal mixed social gathering of S's friends, two girls publicly flirt with S upon noticing and admiring a picture of S in the freshman directory of two years before.

Blushes.

M - 4 (184-17-123)

while among crowd exiting S's graduation, a friend's mother makes S and her son pose for a picture.

S feels foolish with all those people around.

S feels graduation to be a farce anyway.

S believes friends to be making wisecracks.

Blushes.

S asserts that he always blushes when he has his picture taken.

M - 5 (654-19-123)

During Thanksgiving vacation S's father comments that S's hair is too long.

Family agrees.

Blushes.

M - 6 (467-04-132)

with new dorm mates (some unknown to S) at dinner, S is publicly asked about his "hickey" (an accidental burn inadvertently left unbandaged by S).

S's roommate informs table of S's dating exploits of previous night (all fictitious).

Blushes, laughs, attempts explanation.

M - 7 (156-10-121)

not having paid attention, S suddenly finds himself called upon in rhetoric class.

Blushes, and eventually makes satisfactory answer to question.

M - 8 (556-10-331)

after teasing girlfriend with his daring at the wheel, S briefly loses control of car he is driving.

Girlfriend says, "Boy, I bet you feel like an ass."

S responds, "Yes".

S asserts that he blushed but nowhere identifies exactly when he blushed.

M - 9 (256-02-123)

Loses trunks while swimming at pool with girlfriend, and sister and her boyfriend.

Retrieves trunks and emerges from pool.

Blushes.

M - 10 (168-10-331)

Friendly female acquaintance introduces S to her girlfriend as her "favorite tripping partner."

Understanding his friend to have been describing her girlfriend S says "Oh, yea?"

S realizes his error, blushes.

S writes: "The realization that I (in my eyes) did something stupid, made me blush."

M - 11 (457-20-333)

Parking with girlfriend, discussing sex.

Finds topic disconcerting.

Blushes.

Continues discussion.

M - 12 (487-04-131)

Girl at party probes S's sex life.

S blushes.

M - 13 (384-01-322)

farts in company of father and relatively unknown family visitor (sister's future mother-in-law).

Blushes.

M - 14 (422-04-133)

at fraternity meeting, S is teased about having sex with girl previously intimate with several other fraternity brothers.

S nowhere mentions blushing in his narrative.

M - 15 (164-08-323)

Accidentally runs into girl who had previously rejected S's dating invitation.

S and girl both blush.

M - 16 (185-18-122)

is complimented by family and friends of parents on one of first attempts at art.

Blushes.

M - 17 (212-02-132)

At party and has pants pulled down by a guest.

S nowhere mentions blushing in his narrative.

M - 18 (554-09-131)

is exiting classroom with friends and knocks over standing ashtray.

Blushes. - (everyone laughed including S)

M - 19 (not coded)

gets angry with roommate's self-pitying attitude.

Face flushes.

M - 20 (156-06-123)

S is dining with 3 co-workers, 2 of whom are also his roommates.

Roommates tell 3rd co-worker (female) of S's larceny on the job.

Blushes.

M - 21 (487-08-131)

is manning fair booth with same age couple.

Couple's female partner attempts to provoke her boyfriend by putting her arms around S.

Blushes.

M - 22 (255-02-331)

Girlfriend remarks on hole in S's pants.

S blushes.

M - 23 (126-11-321)

Mutual male friend walks up while he is under discussion by S and friendly female acquaintance.

S blushes.

Male friend had commented the day before that everytime he saw S, S had his arm around another woman - male friend then walked up to where S was talking with yet another female friend. S says he blushed because of previous day's comment.

M - 24 (166-07-323)

Boss tells S of having learned of S's unfavorable public remarks about him (Boss).

S blushes.

M - 25 (467-11-322)

is asked by girl to reconfirm his affection for her after previous night's drunken loveplay (S does not, in fact, hold much affection for girl).

Blushes.

M - 26 (656-07-132)

has hot comb returned to him in middle of dorm meeting. - everyone looked with smirks on many faces.

Blushes.

M - 27 (not coded)

(cannot recall ever having blushed.)

M - 28 (116-10-123)

called upon to read in French class, S reads poorly.

Blushes.

M - 29 (266-02-123)

is "streaking" and is caught by police, who are friendly acquaintances of S's.

Later, friends bring S's clothes to S in police station.

S doesn't make clear exactly when he blushed.

M - 30 (682-09-132)

is laughed at in class for spilling ink on self.

Blushes.

responds by exiting classroom.

M - 31 (416-11-332)

Girlfriend overhears S being flirted with by girl previously unknown to S.

S returns to girlfriend.

Blushes.

M - 32 (126-11-133)

is admonished by teacher to be quiet in class - while class stared at S.

Blushes.

M - 33 (386-01-322)

is incontinent in washroom, and angry janitor demands that S clean up.

other washroom occupant encounters scene and stares at S.

S blushes, and replies to janitor.

M - 34 (139-10-122)

is returned a retest in class and notes his failure.

S felt others saw his grade.

S had studied hard for the retest.

S had told instructor as he took retest that he felt it was easy.

M - 35 (177-10-123)

is ill prepared for high school speech and is called upon.

Blushes.

("I usually blush when I have to get in front of people. Perhaps it's because I'm afraid that I'm going to make a fool out of myself.")

M - 36 (674-18-123)

S, a weight-lifter, is giving speech in public health class.

Girl remarks audibly on S's physique.

Finds speech-making itself to be extremely disconcerting.

Blushes.

M - 37 (586-09-133)

Trips while keeping score on board for classroom game - whole class laughs.

Stands up, blushes.

M - 38 (468-04-123)

Teacher of discussion group challenges S's opinion on group sex.

S responds by asserting that opinion arises out of personal experience.

Blushes.

(S felt he had been pressured into disclosing a very personal part of his life.)

M - 39 (112-10-133)

watching TV, S is informed by friend that his comment on TV show had been made just previously by someone else.

S nowhere mentions blushing in his narrative.

M - 40 (446-12-321)

Doesn't expect roommate in room, but finds him sleeping with his (roommate's) girlfriend.

Blushes, exits.

M - 41 (657-18-133)

visits girlfriend, who is in all-female gathering.

One girl remarks that S is good-looking.

S blushes.

M - 42 (288-02-132)

At age of 11 or 12 S has pajamas intentionally pulled off during boisterous family play.

Blushes.

M - 43 (319-01-332)

farts while flirting with 2 unknown girls.

Blushes.

M - 44 (559-09-132)

Trips while walking with girlfriend and friends. others laughed.

Blushes.

M - 45 (458-04-131)

is with new female acquaintance and their mutual friends.

Partner remarks on having heard "all about" S and another girl.

Laughs, blushes.

M - 46 (337-01-122)

is flatulent among friends and strangers in chemistry lab.

Blushes.

M - 47 (147-18-131)

with S present, father overpraises S to relatives.

S blushes.

M - 48 (126-14-122)

Friend tells S before girl attractive to S, and before others, that the girl likes S.

Blushes, turns away.

M - 49 (177-07-133)

Rhetoric teacher is reading (anonymously) S's account of ostensibly fictional - but actually true - embarrassing experience.

S blushed.

O started chuckling - knew it was S's paper because S was blushing.

M - 50 (156-18-122)

is dining with friends and strangers, and is praised by unknown girl for acceptance into med. school.

Blushes.

F - 1 (412-06-131)

is with friends and is told of drunken behavior of a previous night.

S nowhere mentions blushing in her narrative.

F - 2 (116-08-321)

is in cafeteria and mistakes stranger for friend.
teases stranger about her eating, then discovers
her error.

Blushes.

F - 3 (677-10-132)

S's dress's price tag is suddenly revealed
during party.

S rips tag off, tearing dress.

S mentions blushing, but doesn't make clear
exactly when she blushed.

("I felt pretty stupid and all the people there,
I think, also thought I was kinda stupid.") Others
were friends - so S laughed with them.

F - 4 (487-04-132)

inadvertently enters men's room at European
youth hostel.

Realizes mistake, exits, is greeted by laughter
of male friends.

Laughs, blushes.

("The main cause of my blushing, was because
the boys were laughing at me, and it was referring
to sex.")

F - 5 (536-17-121)

enters party on crutches.

Everyone asks what happened.

Hasn't yet acquired any agility on crutches.

Blushes, laughs, explains.

(being the focal point of a party because S was
somewhat different than the rest caused S to blush
when first met up with the situation)

F - 6 (127-11-332)

Patient tells S, a hospital worker, that S is nicer than her co-workers.

S replies that all her co-workers are nice, but inwardly agrees with patient.

Blushes, is told "See, you're telling a lie, you're blushing".

F - 7 (473-11-322)

S asks boyfriend how many times he's had sex, and is told to mind own business.

Blushes.

S is unsure as to whether she actually blushed.

F - 8 (147-10-133)

exclaims at lunch that she is unable to understand college newspaper's weather bulletins.

is asked whether she'd read freshman bulletin's explanation of weather bulletins.

Not realizing companion's practical joke, S replies "No".

Everyone laughs, S blushes.

F - 9 (127-10-133)

is waiting to take "blushing questionnaire" and is told by fellow student that experiment involves shocks.

begins to leave.

Fellow student says he was joking.

Blushes.

F - 10 (186-11-123)

is making facetious campaign speech in otherwise serious high school election in front of hundreds of fellow students.

Blushes.

F - 11 (168-11-132)

Teacher mildly reprimands S for not paying attention.

Blushes.

F - 12 (214-02-132)

is scrutinized on subway, then is informed by lady that shirt is unbuttoned.

Blushes.

F - 13 (527-09-133)

is with friends doing dishes and breaks dish.

Blushes.

(S felt like an A-1 klutz, as others know she is.)

F - 14 (437-04-132)

is with new boyfriend, previous lover, dormmates and their friends.

One of dormmate's male friends (stranger to S) hugs S and inquires as to why she wouldn't sleep with him the previous night (a fictitious story).

S blushes.

F - 15 (126-18-322)

friendly male dormmate unexpectedly brings gifts to S in anticipation of her leaving college.

S opens gifts, blushes.

F - 16 (147-07-133)

is introduced to boy attractive to S, and finds her friends, and boy and his friends, all remarking on how they knew S had wanted to meet boy.

Blushes.

F - 17 (536-18-121)

teacher compliments S in class on excellence of her just completed public speaking effort.

S blushes.

F - 18 (156-11-133)

in magazine interview S explains before 3 other religious workers why she doesn't attend church regularly (other 3 attend church regularly).

Blushes.

F - 19 (556-10-133)

S, admittedly a would-be "woman's libber" competes with male in physical ed. class and loses.

Phys. ed. teacher reports all scores to class, pausing to laugh at S's score.

Blushes.

F - 20 (127-08-132)

S arrives in dorm, and, intending to tease mimics stranger's voice coming from dormmate's room (S mistook the voice for that of a friend).

Enters dormmate's room, realizes mistake, apologizes as her friends tease her.

S mentions blushing but doesn't make clear exactly when she blushed.

F - 21 (262-02-323)

Boyfriend is in bathroom when strangers to S (acquaintances of boyfriend) unexpectedly enter apartment room where S has been lounging unclothed with boyfriend.

S runs into another room.

S nowhere mentions blushing in her narrative.

F - 22 (126-11-123)

speaks out against classmate's request for special treatment in discussion section.

Blushes.

F - 23 (186-07-322)

during argument, boyfriend brings up S's other boyfriend.

S reacts angrily, blushes.

F - 24 (468-04-132)

After single date S's date's friends, encountered in dining commons, teases S about her relationship with date.

Tries to ignore remarks, blushes.

F - 25 (594-07-132)

in grammar school, S absentmindedly sings in bathroom in full hearing of her class.

Exits bathroom to classmate's laughter.

Laughs, blushes.

Felt embarrassed not humiliated, cause kids were laughing with S not at her.

F - 26 (127-08-132)

figures out identity of author of anonymous greeting of S on dorm's memo board.

Later, among friends, S sees greeter (male dorm-mate) outside room.

Not intending greeter to hear, S remarks "Hi, (Name)". Greeter answers "Hi".

Everyone laughs.

S blushes, laughs.

F - 27 (156-10-332)

is with disliked stepsister and is making class schedule change at registrar's office.

is mildly reprimanded by male clerk for filling-in form inadequately.

Blushes.

S writes that she doesn't know whether she blushed with attraction for male clerk, or with embarrassment in front of disliked stepsister.

F - 28 (438-20-131)

is watching TV with boyfriend and his male friends.

Male company continually makes joking comments about program - most with sexual connotations.

S blushes.

F - 29 (656-08-322)

After attempting to aid fellow laundromat customer, S overhears the customer talking with laundromat manager and incidentally describing (short-haired) S as a "boy".

Blushes.

(S was mostly afraid customer would discover her error, and S figured it would be less embarrassing if customer kept assuming that S was a boy.)

F - 30 (486-02-333)

is swimming and discovers that she is being openly watched by older male neighbor to whom she has been attracted.

Blushes.

F - 31 (174-19-133)

Never having previously said anything in rhetoric class, S speaks up briefly.

Everyone looks at S. Teacher remarks "Oh, the pole (referring to pole adjacent to S) speaks."

Blushes.

F - 32 (678-18-323)

having lost weight, S is complimented in class by male classmate.

Blushes.

F - 33 (467-04-332)

Dormmate pointedly asks S, whom she had believed to have been a "prude", about nocturnal male visitor (actually no more than a friendly acquaintance of S's).

S blushes.

F - 34 (156-11-123)

is with 3 roommates after all 4 had eaten cake meant for entire dorm corridor.

Male dormmate enters, asking whereabouts of cake.

4 roommates laugh, engage in mutual looking.

S says "What cake?", male leaves room.

S blushes.

Later, S learns of private joke 3 roommates had had with regard to the male dormmate.

F - 35 (287-02-133)

in eighth grade, classmate yells "Your slip is showing" to S across classroom.

S blushes.

F - 36 (116-08-322)

shows surprise at learning that friend's parents won't be attending his (friend's) wedding.

is told by friend that his parents are dead.

S says she is "sorry", blushes.

F - 37 (187-08-332)

while daydreaming S's attention is caught by words of 2 women coworkers. S looks up and blushes and is ridiculed by coworkers for blushing. S felt uncomfortable but returned to work and another daydream.

F - 38 (147-08-321)

Using wrong name, S introduces male acquaintance to roommate.

Acquaintance correctly introduces self to S's roommate, then smiles at S.

S blushes, apologizes.

F - 39 (162-07-133)

Male acquaintance from previous night's party yells across dining room, "There are the 3 alcoholics" at S and 2 girlfriends.

S nowhere mentions blushing in her narrative.

F - 40 (146-18-123)

Boyfriend shows S and their 2 friends (another couple) his new car.

S is overcome with "Joy", blushes.

F - 41 (444-12-131)

Partying on an all male dorm floor, S sees floor resident entering shower stall as she leaves bathroom.

is teased outside bathroom by dorm residents.

Blushes.

F - 42 (414-04-322)

Somewhat disliked female friend informs S in front of a close girlfriend of S's that a former boyfriend of S's has told her (disliked friend) that he has had sex with S.

S denies accusation (although it is true),

Blushes.

F - 43 (526-18-123)

Dance instructor compliments S in front of class on just completed dance.

S blushes.

F - 44 (136-11-132)

Instructor assigns S a special project in front of class.

Male classmate accuses S of being a "teacher's pet".

S blushes, responds "Not really".

S writes generally of incident: "I was not in control of their perceptions of me".

(S felt awkward and at a loss as how to respond.)

F - 45 (116-14-323)

Given friend's information, S angrily asks boyfriend over phone if he's been seeing another girl.

Boyfriend tells S of single date with another girl a month earlier.

S blushes.

F - 46 (487-04-133)

High school teacher-coach (A family friend) falsely intimates to class that S and a male classmate (coach's protege) are affectionate towards each other.

S blushes.

F - 47 (145-11-322)

S inadvertently underpays for her groceries; cashier told S so in a manner which made S feel cashier thought it was done intentionally. S laughed and tried to explain but cashier was too busy to listen to S rationalized by saying "It's been a long day". S embarrassed by being made to feel guilty and usually blushes when embarrassed.

F - 48 (488-04-132)

Doubledating with roommate, S is with "college boyfriend" (as contrasted with "hometown boyfriend").

While S's roommate (who knows of "hometown boyfriend") is in back seat, "College boyfriend" kisses S.

With S present, S's roommate later relates incident to S's other two roommates.

S blushes.

F - 49 (143-07-323)

in marriage counseling session, with husband present, S is asked opinion on separation.

reacts very emotionally, possibly blushes.

S is very unsure as whether she blushed.

(S felt, in front of husband and counselor, "on the spot" because S had to expose her inadequate and unsure feelings)

F - 50 (584-17-123)

declared queen of high school sophomore prom - S and date are made to dance alone before others present.

S blushes.

Appendix E
Correlation Matrix

Table A

Intercorrelation Matrix of Items on the Questionnaire
on Blushing and Correlations between Epstein Personality
Dimensions and Items on the Questionnaire on Blushing

<u>Questionnaire Item</u>	Pearson Correlations			
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
1. Discomfort felt by subject recalling an instance of blushing		.17	-.10	.00
2. Sensitivity felt by subject toward disapproval	.17		.10	-.34***
3. Embarrassment felt by subject at praise and/or compliments	-.10	.10		-.25*
4. Frequency of subject's asking questions in class	.00	-.34***	-.25*	
5. Presence felt by subject of deeply shameful impulses	.21*	.27**	.05	-.14
6. Anxiety felt by subject re. what others think of him	.18	.53***	-.01	-.22*
7. Self-reported style of dress (conservative - "modish")	-.05	-.15	-.15	.02
8. Incidence of subject's anxiety anticipating blushing	.09	.22*	-.01	-.27**
9. Incidence of blushing among family members	-.09	.27**	.14	-.16
10. Anxiety felt by subject talking before a group	-.03	.34***	.13	-.43***
11. Subject's self-characterization (introvert - extrovert)	-.06	-.33***	-.14	.41***

Table A Continued

<u>Questionnaire Item</u>	Pearson Correlations			
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
12. Subject's self-reported satisfaction with self	.01	-.19	-.10	.20*
13. Parental style (demanding - accepting)	-.18	.02	-.01	.19
14. Subject's self-reported overall incidence of blushing	.16	.33***	.20*	-.11
15. Incidence of solitary blushing by subject	.12	.03	.15	.08
16. Subject's use of denial when spoken well of	.06	.16	.44***	-.26**
17. Subject's fear that his true self would be disapproved of	.04	.09	.22*	-.16
18. Presence felt by subject of embarrassing childhood memories	.27**	.30**	.04	-.17
19. Self-rated skin-coloring (light - dark)	-.23*	-.08	.02	.03
<u>Class and Dimension</u>				
Basic Emotions				
20. Unhappy-Happy	-.09	-.16	.04	.18
21. Frightened-Secure	-.21*	-.39***	.09	.07
22. Angry-Kindly	-.04	-.06	.02	.10
Energy Dimensions				
23. Nervous-Calm	-.17	-.26**	.05	.04
24. Sluggish-Energetic	-.15	-.24*	-.07	.19
25. Unfeeling-Alert	-.02	-.21*	-.08	.31**

Table A Continued

<u>Class and Dimension</u>	Pearson Correlations			
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
Integration Dimensions				
26. Disorganized-Clear-minded	-.18	-.28**	-.11	.05
27. Conflicted-Singleness of Purpose	-.23*	-.31**	.08	.16
28. Restrained-Free	-.09	-.25*	-.09	.23*
29. Inhibited-Spontaneous	-.02	-.39***	-.05	.33***
Self-Esteem Dimensions				
30. Unworthy-Worthy	-.09	-.21*	-.08	.20*
31. Incompetent-Competent	.01	-.34***	-.16	.39***
32. Disliked-Likeable	-.04	-.22*	-.06	.21*
33. Helpless-Powerful	-.21*	-.36***	-.13	.23*
34. Guilty-Pleased with One's Values	-.07	-.24*	-.06	.21*

Table A Continued

Pearson Correlations					
	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
<u>1.</u>	.21*	.18	-.05	.09	-.09
<u>2.</u>	.27**	.53***	-.15	.22*	.27**
<u>3.</u>	.05	-.01	-.15	-.01	.14
<u>4.</u>	-.14	-.22*	.02	-.27**	-.16
<u>5.</u>		.38***	-.04	.30**	.12
<u>6.</u>	.38***		-.12	.10	.15
<u>7.</u>	-.04	-.12		-.12	-.06
<u>8.</u>	.30**	.10	-.12		.35***
<u>9.</u>	.12	.15	-.06	.35***	
<u>10.</u>	.10	.30**	.01	.17	.19
<u>11.</u>	-.33***	-.24*	.09	-.30**	-.12
<u>12.</u>	-.14	-.41***	.15	-.11	.03
<u>13.</u>	-.15	-.26**	.07	-.10	.22*
<u>14.</u>	.11	.29**	-.13	.40***	.43***
<u>15.</u>	-.01	.08	-.09	.26**	.27**
<u>16.</u>	.25*	.37***	-.14	.07	.04
<u>17.</u>	.31**	.35***	-.14	-.06	.01
<u>18.</u>	.53***	.28**	-.11	.38***	.22*
<u>19.</u>	-.04	-.09	.04	-.05	-.03
<u>20.</u>	-.33***	-.37***	.01	-.12	.11
<u>21.</u>	-.32***	-.29**	.06	-.15	.07
<u>22.</u>	-.23*	-.21*	-.02	-.14	-.09

Table A Continued

Pearson Correlations					
	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
<u>23.</u>	-.30**	-.36***	.13	-.23*	.06
<u>24.</u>	-.32***	-.32***	-.03	-.24*	-.05
<u>25.</u>	-.30**	-.27**	.08	-.24*	-.07
<u>26.</u>	-.29**	-.26**	.05	-.13	.11
<u>27.</u>	-.22*	-.33***	.03	-.10	-.05
<u>28.</u>	-.28**	-.27**	.13	-.15	.04
<u>29.</u>	-.40***	-.42***	.16	-.32***	-.19
<u>30.</u>	-.32***	-.38***	.07	-.20*	.02
<u>31.</u>	-.23*	-.35***	-.02	-.26**	-.08
<u>32.</u>	-.37***	-.39***	.07	-.06	.09
<u>33.</u>	-.25*	-.48***	.19	-.26**	.00
<u>34.</u>	-.31**	-.35***	.10	-.16	-.06

Table A Continued

Pearson Correlations					
	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>
<u>1.</u>	-.03	-.06	.01	-.18	.16
<u>2.</u>	.34***	-.33***	-.19	.02	.33***
<u>3.</u>	.13	-.14	-.10	-.01	.20*
<u>4.</u>	-.43***	.41***	.20*	.19	-.11
<u>5.</u>	.10	-.33***	-.14	-.15	.11
<u>6.</u>	.30**	-.24*	-.41***	-.26**	.29**
<u>7.</u>	.01	.09	.15	.07	-.13
<u>8.</u>	.17	-.30**	-.11	-.10	.40***
<u>9.</u>	.19	-.12	.03	.22*	.43***
<u>10.</u>		-.40***	-.15	-.14	.25*
<u>11.</u>	-.40***		.20*	.12	-.09
<u>12.</u>	-.15	.20*		.17	-.19
<u>13.</u>	-.14	.12	.17		-.07
<u>14.</u>	.25*	-.09	-.19	-.07	
<u>15.</u>	.04	.02	.01	-.08	.49***
<u>16.</u>	.04	-.11	-.37***	-.20	.26**
<u>17.</u>	.15	-.19	-.20*	-.17	-.07
<u>18.</u>	.21*	-.28**	-.03	-.28**	.39***
<u>19.</u>	.08	.03	-.12	.13	-.26**
<u>20.</u>	-.21*	.39***	.38***	.14	.02
<u>21.</u>	-.27**	.27**	.31**	.06	-.09
<u>22.</u>	-.14	.21*	.19	.00	.02
<u>23.</u>	-.22*	.20*	.28**	.10	-.22*

Table A Continued

Pearson Correlations					
	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>
<u>24.</u>	-.23*	.40***	.23*	.19	-.13
<u>25.</u>	-.30**	.55***	.26**	.17	.00
<u>26.</u>	-.25*	.24*	.28**	.18	-.16
<u>27.</u>	-.26**	.14	.20*	.02	-.22*
<u>28.</u>	-.28**	.37***	.34***	.13	-.16
<u>29.</u>	-.36***	.49***	.35***	-.02	-.14
<u>30.</u>	-.24*	.40***	.47***	.18	-.18
<u>31.</u>	-.32***	.36***	.48***	.11	-.23*
<u>32.</u>	-.21*	.47***	.32***	.07	.00
<u>33.</u>	-.37***	.47***	.41***	.22*	-.29**
<u>34.</u>	-.29**	.36***	.27**	.12	-.13

Table A Continued

Pearson Correlations					
	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>
<u>1.</u>	.12	.06	.04	.27**	-.23*
<u>2.</u>	.03	.16	.09	.29**	-.08
<u>3.</u>	.15	.44***	.22*	.04	.02
<u>4.</u>	.08	-.26**	-.16	-.17	.03
<u>5.</u>	-.01	.25*	.31**	.53***	-.04
<u>6.</u>	.08	.37***	.35***	.28**	-.09
<u>7.</u>	-.09	-.14	-.14	-.11	.04
<u>8.</u>	.26**	.07	-.06	.38***	-.05
<u>9.</u>	.27**	.04	.01	.22*	-.03
<u>10.</u>	.04	.04	.15	.21*	.08
<u>11.</u>	.02	-.11	-.19	-.28**	.03
<u>12.</u>	.01	-.37***	-.20*	-.03	-.12
<u>13.</u>	-.08	-.20	-.17	-.28**	.13
<u>14.</u>	.49***	.26**	-.07	.39***	-.26**
<u>15.</u>		.11	.06	.25*	-.16
<u>16.</u>	.11		.43***	.22*	.01
<u>17.</u>	-.06	.43***		.19	-.01
<u>18.</u>	.25*	.22*	.19		-.14
<u>19.</u>	-.16	.01	-.01	-.14	
<u>20.</u>	.05	-.38***	-.39***	-.27**	-.03
<u>21.</u>	-.01	-.17	-.16	-.25*	-.08
<u>22.</u>	.10	-.21*	-.36***	-.12	-.13
<u>23.</u>	.01	-.21*	-.22*	-.26**	.13

Table A Continued

Pearson Correlations					
	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>
<u>24.</u>	-.09	-.28**	-.19	-.23*	-.01
<u>25.</u>	-.02	-.28**	-.34***	-.24*	-.14
<u>26.</u>	-.08	-.31***	-.29**	-.34***	.00
<u>27.</u>	-.09	-.18	-.20*	-.28**	.03
<u>28.</u>	.03	-.17	-.23*	-.15	.11
<u>29.</u>	.15	-.14	-.21*	-.20*	-.03
<u>30.</u>	-.05	-.38***	-.37***	-.24*	.10
<u>31.</u>	-.05	-.40***	-.27**	-.22*	-.04
<u>32.</u>	.06	-.36***	-.45***	-.30**	.06
<u>33.</u>	-.11	-.33***	-.26**	-.28**	.06
<u>34.</u>	-.01	-.28**	-.34***	-.32***	-.02

Note: Row placement of the items on the questionnaire on blushing, as indicated by the numbers 1 through 19, is identical with column placement. The table is based on data from 100 subjects. Two-tailed significance tests are used.

* $p < .05$

** $p < .01$

*** $p < .001$

